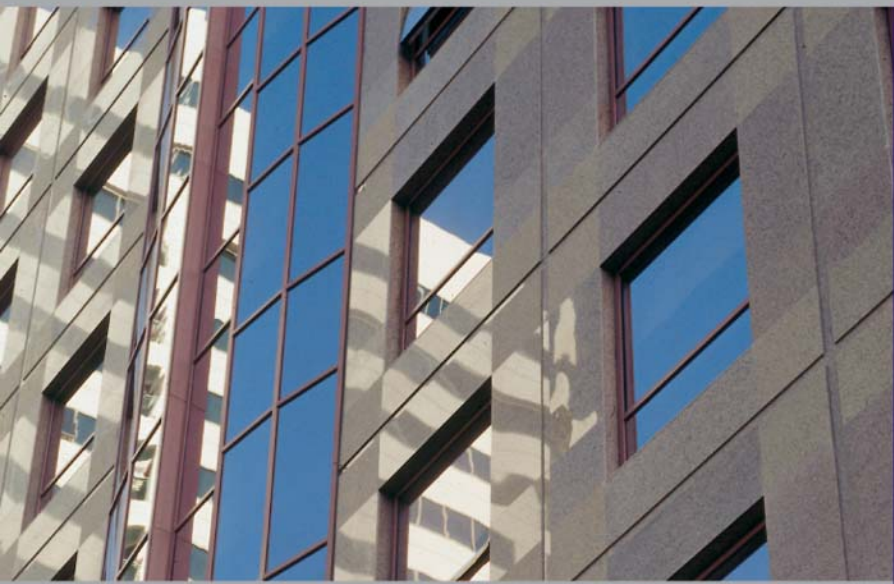


VISIT...

LANZAROTE
Caliente.COM

SALMA SAMAR DAMLUJI



THE ARCHITECTURE OF THE
UNITED ARAB
EMIRATES

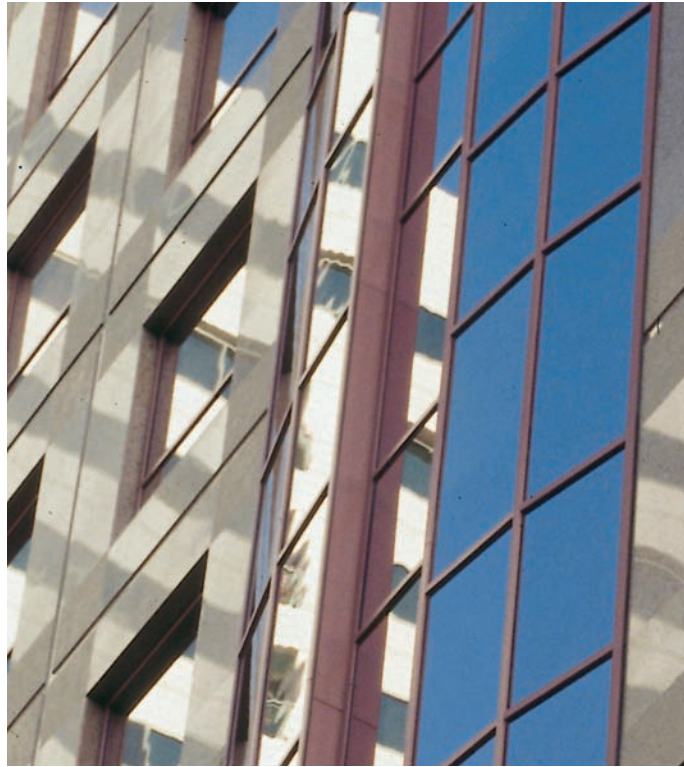
THE ARCHITECTURE OF THE
UNITED ARAB
EMIRATES



In memory of

His Highness Shaykh Zayed Bin Sultan Al Nahyan
The founder of the new United Arab Emirates

SALMA SAMAR DAMLUJI



THE ARCHITECTURE OF THE UNITED ARAB EMIRATES

Garnet
PUBLISHING

CONTENTS

The Architecture of the United Arab Emirates

Published by
Garnet Publishing Ltd
8 Southern Court, South Street
Reading, RG1 4QS, UK

Text copyright ©
Salma Samar Damluji 2006
For illustrations see p. 320

All rights reserved.
No part of this book may be
reproduced in any form or by any
electronic or mechanical means,
including information storage and
retrieval systems, without permission
in writing from the publishers, except
by a reviewer who may quote brief
passages in a review.

First Edition 2006

ISBN-13: 978-1-85964-156-9
ISBN-10: 1-85964-156-3

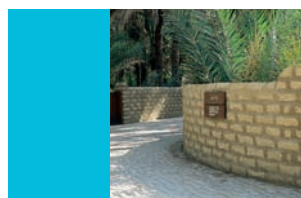
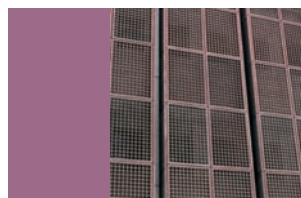
British Library Cataloguing-in-
Publication Data
A catalogue record for this book is
available from the British Library.

EDITORIAL
Emma G. Hawker

DESIGN
David Rose
Samantha Barden
Mike Hinks
Janette Hill
Neil Collier

REPROGRAPHICS
Nick Holroyd

Printed in the Lebanon



Map of the United Arab Emirates

vi

Note on Transliteration

viii

■ **Introduction** 1

Salma Samar Damluji

■ **Adapting to Change** 5

Frauke Heard-Bey

MODERN ARCHITECTURE

■ **Brave New Cities** 23

Salma Samar Damluji

■ **Urbanism and Town Planning** 101

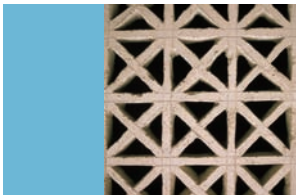
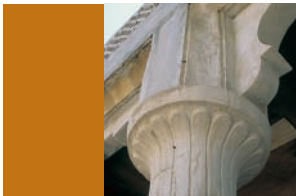
Nazar Othman Ahmad

■ **Constraints and Opportunities** 121

Abbad Al Radi

■ **Housing Development in Al ‘Ayn** 139

Talal M. Abdullah



VERNACULAR ARCHITECTURE

	The Islamic Architecture of Dalmā Island	151
	Geoffrey King	
	The Urban Architecture of Al Bastakiyyah	179
	Keith Olroyd-Robinson	
	The Ancient Mosques of Ra's al Khaymah	205
	Didier Willems	
	The Forts and Towers of Al 'Ayn	223
	Hasan Muḥammad Al Naboodah	
	Analysis of the Square: Al Murabba'ah	239
	Abdul Sattar Al-Azzawi	
	In Search of the Vernacular	265
	Salma Samar Damluji	
	Notes	309
	Glossary	315
	Bibliography	316
	Acknowledgments	320
	Index	321





Note on Transliteration

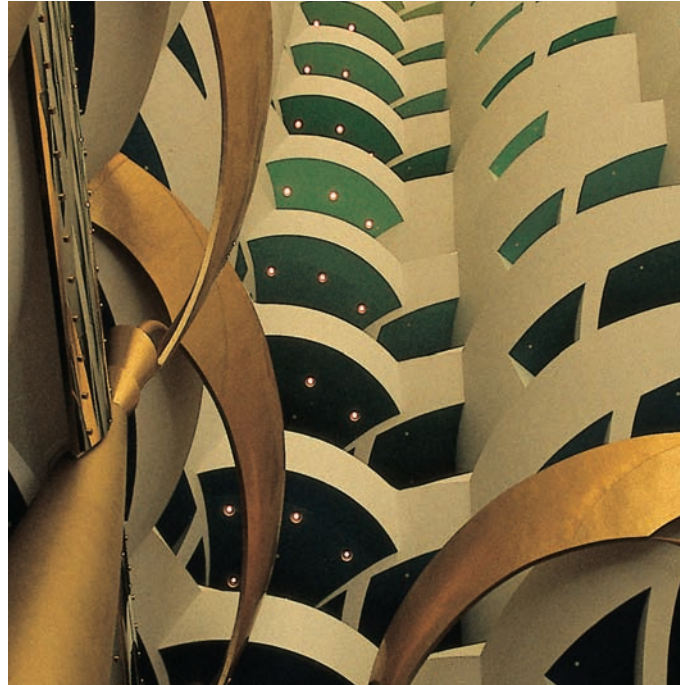
The scheme used is that of Arabian Studies of the University of Cambridge. Proper names and non-architectural terms which have an accepted English spelling – e.g. Muscat, wadi, muezzin – are given in this way.

‘ ء	d د	ṭ ط	m م	ā آ
a أ	dh ذ	ẓ ظ	n ن	at ة
b ب	r ر	‘ ع	h هـ	ah هـ
t ت	z ز	gh غ	w و	ū و
th ث	s س	f ف	y ي	ī يـ
j ج	sh ش	q ق		
ḥ ح	ṣ ص	k ك		
kh خ	ḍ ض	l ل		

All quotations from the Qur’ān are taken from the edition published by Dār al ‘Arabiyyah, Beirut, 1968, translated by Abdullah Yusuf Ali.

All AD and AH (Hijrah) conversions are drawn from *The Islamic and Christian Calendars* by G. S. P. Freeman-Grenville, published by Garnet, Reading, 1995.

INTRODUCTION



The cities of the United Arab Emirates present a fascinating case study of the urban development which results when planning, architectural design and construction are wholly fashioned after the modern order. The study is all the more interesting when viewed in the context of the specific environment and the cultural fabric of a desert region in Arabia that has undergone an unprecedented form of development since the late 1960s. The coming of modern architecture and the International Style, in the cities of Abu Dhabi and Dubai in particular, was coupled with extensive cultivation projects implemented in an originally barren and arid landscape bordering on the expanse of the desert sands. The quality of change has therefore been ecological in terms of the effects seen in the built and natural environment. Each Emirate, however, represents a

different criterion in terms of architectural development, urban setting and resultant ecological implications. The accelerated construction projects, encompassing the infrastructure and superstructures, dictate an ongoing process of urban development which has marked an exceptional building experience with implications generally for the evolution of the city, town and landscape.

The research described in this book has taken into account the vernacular context through the traditional forms of building that existed in the area, while examining underlying concepts of the 'master plan' studies adopted for the major city centres. This was approached by looking at the phases of growth and change within the immediate urban fabric of the centres and the relationship of this development with the towns and settlements of the periphery. However, while the master

plans of Dubai and al 'Ayn were provided for review by the writer, the Abu Dhabi town-plan studies were not available for the purpose of this work.

Another aspect of interest is the socio-economic factors and influences that determine the nature and quality of urban development, and possibly the characteristics attached to architectural design and represented styles. These factors are a key to understanding the architectural story of the towns and cities of the UAE, their past and future development. Of critical interest is the emphasis on the restoration, renovation and reconstruction of the traditional architecture and the directions indicating the use of Islamic or vernacular architectural features and elements in modern building façades.

The natural backdrop to the cities of the Arabian Gulf is dramatic, distinguished by the immaculate expanse of desert sands that encroach upon the setting of the major cities on the serene blue shores of the Arabian Gulf to the north and the Gulf of Oman to the east. Accompanied by the historic values embedded in the region of Arabia, the quest for analysing and projecting the complex forces that contributed to the formation of those modern Arab cities becomes compelling, on an international scale, and intellectually challenging.

The documentation and research presented in this book includes contributions by professionals and specialists in the UAE who have witnessed this process of urban development from an internal viewpoint, and on a multi-disciplinary level. The encouraging reception and cooperation received from national and private institutions while researching this project, confirmed the need for a publication that reviewed the features of the architecture and the implemented urban planning projects, without undermining the contextual aspects both within and those subsequently alienated from the cityscape: such as the traditional architecture and remaining elements of the architectural heritage. Here, it is portrayed in parallel in order to inform the reader of future avenues that might be explored.

Any book that attempts to cover a whole region or an entire country will be expected to qualify as a comprehensive catalogue with an impartial coverage.

This book is neither conclusive nor passive in its account. It has attempted to represent first-hand views and experiences even though they may be contradictory to the development assumptions and aspirations of national or international architectural practice. The ambivalent situation of form, function and structure in architecture and cities requires consideration. Henri Lefebvre, in his work *Writings on Cities*, investigates this ambiguity or plurality of meanings which is attached to the term 'urban form', pointing out that 'The plurality and confusion of the meanings serve an absence of thought and poverty which takes itself for wealth'. This may explain a complacent condition that has accompanied the development of urban form irrespective of social or cultural barriers.¹ In an attempt to clarify this condition, the treatment of both the modern and vernacular has been approached through a select number of projects.

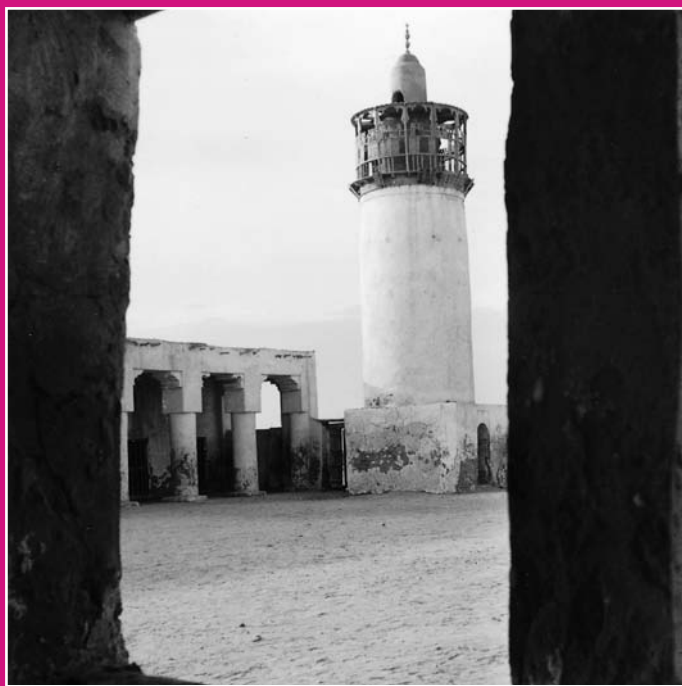
This book is divided into two parts: modern architecture and vernacular architecture. By way of introduction Frauke Heard-Bey discusses the historical context of the UAE with an account of the basic development of the capital city which she has witnessed over the three decades that she has lived there.

The first chapter of Modern Architecture questions the form of new cities, the contribution of international architectural practice and the state of modern Islamic architecture. A background to the process of operation is also identified and discussed (Abu Dhabi and al 'Ayn), citing diverse projects that include the al 'Ayn Oasis and the settlement of the Bedouin community in the Liwā desert. Then Nazar Othman Ahmad reviews the urban development of Abu Dhabi by providing an insight into the town planning of the city, and Abbad al Radi discusses the constraints and opportunities involved in architectural practice and presents some examples of buildings in the city of Abu Dhabi. Both contributors have been partners in private practice in the UAE since the 1980s. An interview held with Talal 'Abdullah provides his contribution of an insider's view of housing development in the city of al 'Ayn, and the changing criteria for popular housing in particular.

The consideration of vernacular architecture in the second half of the book has been augmented with

contributions by Geoffrey King on the architecture of Dalmā Island (buildings which were reconstructed by conservation procedures), Keith Olroyd-Robinson, who carried out an extensive survey of the housing and urban fabric of al Bastakiyyah quarter in Dubai, and Didier Willems who has carried out research and architectural surveys of the mosques of the Northern Emirates, with the section on Ra's al Khaymah published here. Hasan al Naboodah gives a general account of the forts of al 'Ayn, which were the subject of a survey he conducted and here supplemented by architectural surveys. Abdul Sattar al Azzawi, responsible for the work carried out in the regeneration of heritage buildings in Sharjah, Dalmā and Kalbā', contributes with a reading into the nuances, meanings and function of the tower: *al burj* and the *murabba'ah* tower house, with particular reference to Arabic literature. The final chapter covers the prominent work carried out in cities like Sharjah and Dubai on the reconstruction of traditional buildings, regeneration schemes, and the implications and reality of the re-establishment of traditions and heritage on the modern urban fabric and architectural thought.

Salma Samar Damluji



ADAPTING TO CHANGE

An historical background to traditional and
modern living conditions in the United Arab Emirates

Frauke Heard-Bey

Climatic conditions

The striking difference on comparing a map of the Trucial States – as the area was called before the foundation of the United Arab Emirates in 1971 – with one showing the country at the end of the last century, is that previously distinct settlements have increased dramatically in size and in some instances now form continuous urban areas, running from one town to the next. What has not changed is that historically the major towns were all situated on the coast (with the exception of al ‘Ayn and Dhaid), and it is the coastal area where most of the spectacular urban expansion of recent years has taken place.¹

The reason for the uneven population distribution is the climate. Before electricity became available in the 1960s, the people who lived in this area ‘lived lives to which a hundred generations have specialised them in conditions barely tolerable to others’.² Nowadays summer visitors to the UAE may experience a few moments of discomfort as they walk from an air-conditioned car to the cool comfort of a marble-clad hotel, but they will not have to endure the heat and humidity prevailing in the area during the months from May to September with temperatures often well above

45°C and with over 90 per cent humidity on the coast. In this day and age, none of the residents – whatever their status – have to withstand this climate without some relief, at least at night-time, from air-conditioning or a fan.

Yet it was not the discomfort of extreme heat and humidity which made living conditions in this area so very inhospitable, it was the aridity of the entire region which profoundly influenced the lives of people. Permanent settlements need reliable sources of water for drinking, for livestock and for agriculture. Water was the focus of the traditional society’s economy, determining the choice of location for its settlements and for its daily and yearly routines. The absence of water limited the usability of the vast open spaces beyond the small settlements.

The sources of water were rain water and well water or spring water. There are no rivers in the entire region. Annual rainfall figures are low, about 107 millimetres a year away from the mountains. The rains are erratic, unevenly distributed and more frequent near the mountains.³ All areas of the country experience a certain amount of rainfall almost every year – but some parts of the country may go without rain for several years. Although it usually rains between November and April,

Opposite
Minaret of the mosque, Abu Dhabi town

heavy showers and even freak floods can occur during the summer months in isolated locations.

In the past the management of water as the single most precious resource was a community effort and required a great deal of organization and coordination. The mountains of the region are generally devoid of top-soil to retain the rain. Instead, flash floods rush down the wadis, gathering stones and mud, and then either flow directly into the sea or flood low plains and then evaporate quickly in the high temperatures. In anticipation of rain, fields and terraces were prepared to benefit immediately from the water without losing the soil through uncontrolled flow. Rain water was collected in cisterns, often with the help of an elaborate system of stone-lined channels. On the waterless sandy islands rain water was directed into cisterns by pegging out sails to create a catchment area. Finally, some of the rain water soaks away into aquifers, from which it can be drawn via wells.

The ingenious *falaj* system in which rain-fed spring water was brought to settlements was used in the region for many centuries, if not millennia. A tunnel or *falaj* was built from an area where good soil on flat ground promised profitable agriculture to reach a source of water from an aquifer in a mountainous area, possibly 20 or more kilometres away. Vertical shafts provided ventilation while the tunnel was being built, as well as a means of bringing the excavated material to the surface, and access for maintenance. The *falaj* ended in an open section, where the community obtained its drinking water; further downstream the animals were watered and people could bathe and do their washing before the rushing stream was divided into smaller and smaller rivulets,

through which the water was distributed to the date gardens in meticulously timed deliveries.

There was a limit to how deep a well or tunnel could be excavated with the tools that were available. Access to fossil water aquifers was therefore excluded because – where they exist at all – the water is very deep below the surface. Generally the further away from the mountains, the deeper underground is even the source of run-off rain water.

Many wells in the desert hinterland of Dubai contain good water but there is no such aquifer under Abu Dhabi Island, where the population had to rely on very shallow wells in which the rain, mist and humidity which soaked through low dunes was collected in lenses on top of the saline water table. The discovery of this limited source of water on the stretch of coast and coastal islands, which is dominated by salty mud flats called *sabkhab* which are devoid of fresh water, led to the foundation of the town of Abu Dhabi in 1760. An additional reason for siting the new economic and political centre of the tribal confederation of the Banī Yās on this island was that a natural channel leading through the shallow coastline made it possible for boats to sail right up to the northern shore of the island as well as to the more protected inlet of nearby Baṭīn. There are other navigable channels west of Abu Dhabi town, notably at Dhabaiyyah and Jebel Dhannah, but the lack of sweet water meant that no other permanent settlements were founded on any of these inlets – the nearest suitable location with limited sources of water being the bay of Khaur al Udaid at the base of the Qatar Peninsula, some 350 kilometres west of Abu Dhabi town.

Traditional settlements

The UAE is home to many different tribes. At the turn of the last century in what was then called the Trucial States, 44 principal tribes were identified.⁴ Over time, the number of tribes has changed because they formed alliances or split and became independent under their own shaykh. The shaykhs in the past acted as judges within their communities and rallied the male members in times of strife.



Above
Old Arab quarters on Das Island

The socio-political structure of these tribal subdivisions was visible in most settlements where clusters of houses were separated from each other by empty spaces of sand, wadi gravel or beach, depending on the geographical location of the settlement. Such areas were usually inhabited by members of the same sub-tribe. The extended families in the settlement would in turn try to keep a little distance from the other families around them, even though they might be related to each other. None of the towns and very few of the villages of the Trucial States were inhabited by a single tribe or sub-tribes, but they were a patchwork of separate quarters, often having their own neighbourhood mosques.

Even though settlement patterns were fairly similar throughout the area, the appearance of towns and

villages varied because the houses were built using different materials, depending on what was available locally. Away from the mountains, stones were usually impossible to come by. Mud is also unavailable in the sandy desert of the hinterland and in short supply on the Gulf coast. The most prevalent building material was the date palm which grows throughout the UAE wherever there is water.



Top
Barasti huts, Abu Dhabi town



Above
A scene in Abu Dhabi town

Every house in the crescent-shaped line of small Līwā oases in the southern desert of Abu Dhabi, most of the houses in Abu Dhabi town, in Dubai, Sharjah, the other coastal settlements and those in the large oasis of al ‘Ayn and al Buraymī due east of Abu Dhabi, were built ingeniously using the various parts of the date palm. Palm trunks were used for the frame and the roof beam, where this was necessary. The palm branches were stripped of leaves and tied together with ropes made of the fibre surrounding the foot of the tree trunk to make large solid mats which provided the walls of the house. In the summer, the wind could blow through the gaps, allowing for natural ventilation; in the winter one or two additional layers were added for warmth. The palm fronds provided the raw material for densely woven thinner mats, several layers of which formed the roof. They were also hung on the inside of the walls for extra protection in the winter and were often spread on the floor – otherwise the floor was just sand which was renewed from time to time. The form of these houses varied according to the geographical area but they were never more than one storey high. Some had flat roofs, hidden behind the bushy ends of the palm branches, which were left protruding upwards beyond the rooftop.⁵ These are usually called *khaymah*, which is also the word for ‘tent’. Elsewhere, and in particular on the east coast, the palm frond houses had gabled sloping roofs and are called ‘*arīshah*’ – but these names are interchangeable on occasion. The word ‘barasti’ is used in English for all types of palm-frond house and is not an Arabic term.

A smaller variation of the palm-frond house was found in the mountains: the lower part of the walls was built with rough boulders, the floor was often lower than the surrounding ground, the frame was made from palm trunks and the structure was completed with a sloping roof which was covered with palm branches or thick layers of brushwood and palm-frond mats. These houses were not necessarily used on a permanent basis by a large family, but rather by whoever looked after the family date garden or the terraces in the distant wadi.

There is no shortage of alternative building materials in the mountains or on the coastal plains on either side of the Hajar range of mountains, where the wadi

beds are strewn with boulders, gravel or fine mud. Thus in the Ra’s al Khaymah area, in the large coastal oasis of Dibā, in Fujairah, Khawr Fakkān, Kalbā’ and other villages on the east coast and in the mountain villages, houses and forts were frequently built of stone, examples of which can still be seen today. There is a wide range in the size and finish of the various types of stone houses, depending on the means of the owner. Some were built with stone up to the roof, which was then completed in the usual manner with palm branches. Others – as can be seen at the fort of Hail in the hinterland of Fujairah – were clad with mud and/or *juss*, a locally made plaster, which permitted the application of internal and external decoration on the walls, ceilings and crenellations along the roofs.

Compared to such well-finished mountain fortresses the towers in some of the desert locations seem very rough and rudimentary; but it was none the less an achievement to bring together enough of the rather friable building material, which forms a hard surface on some of the inter-dune floors in the Līwā, to build a simple watch tower and refuge for the Bedouin in times of warfare.⁶ Similar slabs of sandstone or solitary outcrops of fossil coral are found intermittently along the coast; such material was used to build the fort in Abu Dhabi.

Mud-brick buildings with palm-frond roofs were common in the oasis of al ‘Ayn and Buraymī about 160 kilometres east of Abu Dhabi town, in Dhaid, in the smaller inland oases and in some of the villages on the East Coast. However, on the western side of the Gulf coast, away from the mountains, the most commonly used material for building substantial houses with two storeys was coral. Pieces of coral, usually round and weighing up to two kilograms, could be found in the shallows of the sea. They were piled up on the beach and exposed to the rain to wash out some of the salt. Due to the nature of its high porosity, walls constructed of these pieces of coral provide excellent thermal insulation. Examples of such coral stone buildings can still be seen in some of the old parts of the coastal settlements between Sharjah and Jazīrt al Ḥamrā near Ra’s al Khaymah and in Kalbā’.

Traditional economies

Apart from the scarcity of water, other resources were not plentiful either in this parched and barren country. Yet the ‘versatile tribesman’⁷ managed to wrest a living from the land, and for generation after generation he raised his family in the proud Bedouin spirit of a particular code of conduct, which is legendary among Arabs. In order not to have to rely on one economic activity alone, and combining several resources and skills in different places and at different times of the year, many families opted for mobility. Their principal wealth was often their camels, which provided them with milk, meat, hair, hide, transport and an income if bartered or sold. The camel-owning families usually also owned some date trees or an entire palm grove in one of the oases in the desert or in a wadi. The harvested dates were treated in such a way that they did not spoil for months, even years, and together with the camel milk they provided the staple food. Dates could be taken on months-long camel trips or on board ship to provide the maximum amount of energy for the minimum amount of weight. Some families, particularly those on the east

coast, exploited the resources of the sea, while tending also their date gardens. The nomads of the mountains of the Musandam Peninsula shared the year between farming on top of the mountains or in the wadis in the winter, and looking after their herds of goats and fishing in the summer.⁸

Thus the nomadic way of life was a way of adapting to the adverse climate and the scarcity of water.⁹ It allowed for the very scant resources of scattered grazing and limited water for irrigation in the vast areas of desert, mountains and coast to be exploited, averting over-use with a system of tribal sharing and mutual assistance in minding camels and harvesting dates.

Where water was more plentiful, permanent settlements could be sustained; but there too, the inhabitants had to maximize locally available resources as well as draw on other resources outside their village or town. Having dealt with the issue of securing the supply of water for the community, other factors determined

Below

Caravan trek in the Līwā district, Abu Dhabi



whether a particular settlement prospered or not in the course of time: economic viability depended on much more than water. Whether an oasis was inhabited temporarily for the date harvest or whether it was a permanently inhabited centre depended largely on its geography. The many small oases of the Līwā are located in a sea of huge sand dunes; and in the past, in the absence of artificial fertilizer and pumped water, this sand could only support date palms. The large oasis of al ‘Ayn and Buraymī on the other hand was blessed with fertile soil, on which fruit trees, grain and vegetables could be cultivated, and its strategic location made it an attractive market for the tribes to the west of the Hajar range of mountains.

Trade was crucial for the prosperity of many of the settlements – and obviously still is. In ancient times overland trade flourished, as did a string of well-defended and wealthy cities, which benefited in particular from the incense trade. These cities lined the trade routes, not only to the north-west of the producer country Dhofar through Yemen to Gaza, but also to the north-east along the edge of the mountains. The al ‘Ayn–Buraymī oasis played an important part in pre-Islamic times as a crossroad for trade and in later centuries as a staging

post for the forces which brought Islam to the area and to Oman.

In medieval times, trade became predominantly seaborne when the Arabs of the Gulf and Oman were able to navigate the Indian Ocean. The settlements, located astride sheltered, deep and easily defended ports gained in importance: Kalbā’, Khawr Fakkān and Dibā on the east coast, as well as Julfar (the predecessor of Ra’s al Khaymah), Sharjah and Jumairah on the Gulf coast, all flourished at different times. However, the rise and decline of trading centres along these coasts were also influenced by politics, which in turn were often governed by the health and wealth of distant markets on which trade depended. For instance, when in the second half of the eighteenth century the influence of the Persians declined after the death of Nadir Shah, the Arab tribes living on either side of the Gulf, near its entrance, were once again able to dominate trade in the Gulf and beyond it. Their settlements expanded, and in particular the fortified town of Ra’s al Khaymah, which became a seat of the Qāsimī rulers and in due course developed rapidly as an economic and strategic centre.¹⁰

Below
Dubai harbour



The pearling industry

The pearls of the Gulf have long been appreciated as beautiful possessions and are even mentioned in some 4,000 year-old cuneiform tablets from Ur in Mesopotamia. During the nineteenth century the demand for pearls increased in India, and by the beginning of the twentieth century the fashion for wearing these oriental treasures spread from the drawing rooms of the British in India to the salons of Paris and New York. The growth in the market for pearls changed what had been an occasional occupation for a few people into an industry which came to dominate the economy of the Arab tribes of the Gulf.

Pearls grow inside a proportion of particular types of oysters which live on the sea bed, at depths of up to about 35 metres. The best pearls used to be found off the southern coast of the Gulf, in particular around the island of Dalmā. Initially, the Bedouin tribes formed cooperatives which owned and equipped wooden boats known as *dhow*s, and shared the proceeds of the season as diving was only possible in the summer months. During

the last decades of the nineteenth century and the early part of the twentieth century the number of boats needed to satisfy the market increased dramatically to about 1,200 for the Trucial Coast.¹¹ By then almost all the boats, which were built from wood imported from India or East Africa, belonged to pearl traders or merchants, who could afford the big financial risks but also earned the largest profits. The tribesmen flocked to the coast in ever-increasing numbers for the season to man the boats, leaving the care of their date palms and camels in the hands of the women and the elderly. Eventually such was the demand for crews to operate the growing number of pearling boats that more people were brought from neighbouring Makran as well as East Africa.

This influx of people led to the rapid growth of coastal settlements. Abu Dhabi town, which was developed with a view to greater participation in maritime activities when Shaykh Shakhbūt bin Dhiyāb built a fort

Below

General view of Dubai harbour



there in the 1790s, was the home port for 410 pearling boats in the first decade of the twentieth century and supported a population of about 6,000 during the winter months.¹² Some families, enticed by several seasons of good cash earnings, abandoned their economic involvement in the desert or the wadis of the mountains entirely to live all year long in one of the coastal towns on their share of the proceeds of the pearling industry. Their wealth was now counted in money, not animals or date palms.

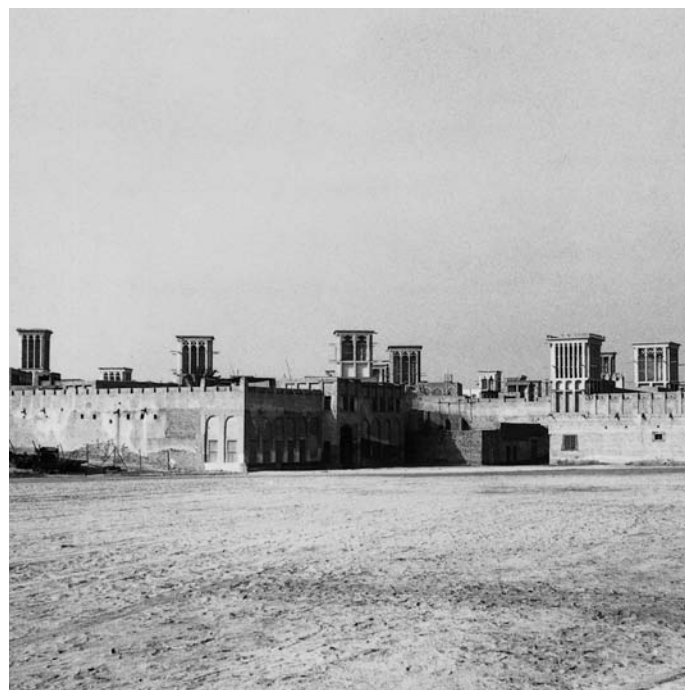
The growth of the cash economy stimulated consumption of imported goods and helped trade to flourish. Dubai and Sharjah, where creeks reaching several kilometres inland behind a protective sandbar provided sheltered harbour facilities, grew steadily as centres for seaborne trade on the Trucial Coast. In 1902 an adverse customs policy introduced by distant Tehran so alienated the community of Arab merchants trading out of Khamir in Bastak, Lingah and other ports on the Persian coast of the Gulf, that they settled in Dubai. They brought with them their trading connections and the twin towns of Dubai and Dayrah on either side of the creek profited from the increase of business to the extent that in 1904 the weekly steamer service was rescheduled for Dubai.

Dubai town was transformed by the influx of merchant families, as they began building large coral-stone houses with windtowers, a feature used in town houses on the opposite coast and designed to provide some cooling during the summer. They changed the skyline of the area immediately adjacent to al Fahidi fort in Dubai and of Shidagha, the quarter which occupies the peninsula forming the entrance to the Dubai creek. Houses with windtowers were subsequently also built by the wealthy families in Sharjah and in Abu Dhabi town.

The pearling boom came to a sudden decline when the markets were swamped with newly invented cultured pearls from Japan, which coincided with the world economic crisis of the 1930s. Those tribal families who had come to rely exclusively on the pearling industry for their livelihood suffered a great deal. The impact of World War II made things worse, with towns and villages on the coast suffering particular impoverishment. The families, who had purchased date gardens in the good years, now had to make full use of their possessions. Others emigrated to neighbouring oil-producing countries when activity picked up there in the 1950s.



Below and left
Windtowers, Dubai town



The oil industry

Initially the activities of the oil company Petroleum Development Trucial Coast (PDTC), which started to make use of the concessions it had secured between 1936 and 1939, had little impact on the living conditions of the inhabitants of the area – not even for the nationals who had become employees of the company. Those involved in the early exploration campaigns lived in army-style tents on the beach or in the desert.

There were nevertheless some major changes during the 1940s in the appearance of the coastal towns, one of the most important being the construction of a new fort in Abu Dhabi. The Ruler, Shaykh Shakhbūt, had decided to improve the accommodation for himself and the families of his brothers and sisters. Instead of building a new fort elsewhere on the island, the new building was planned to surround the old one, leaving the latter standing in one corner of the large courtyard with its elegant arcades on the ground-floor level and along the first-floor gallery. The new fort was an imposing building, which stood by itself at some distance from the sea and the town,

dominating the view of Abu Dhabi from every angle before the tremendous changes a few decades later. The fort was originally the soft colour of the mud with which its walls were finished; later it was painted white.

In the 1950s the British Government was responsible for some additional construction on the coast in the form of new houses and offices for its representatives, first in Dubai and eventually in Abu Dhabi, and schools. The first of these was completed in 1959 in Abu Dhabi and consisted of a simple row of classrooms resembling a train in appearance.

In 1962 the first oil was exported from offshore Abu Dhabi; production from the big onshore oil fields, which were found by the Abu Dhabi Petroleum Company (ADPC), came on stream in 1964, by which time the increase in economic activity and population had already begun to transform the towns on the coast and even made an impact in the hinterland.

Below
The Ruler's Palace, Abu Dhabi





Top, above and above right
The Ruler's Palace, Abu Dhabi



Bottom right
Aerial view of Abu Dhabi, showing the Ruler's Palace

Changes since the 1960s

Living conditions in the country were changed for good with the introduction of concrete. No longer was the construction industry confined to the limited resources of locally available building materials: stone, mud, coral, and palm, and the only affordable import, *chandal* wood from India. In due course, an abundant number of do-it-yourself machines were introduced into every Emirate, and with cement, gravel and water so-called ‘breeze-blocks’ were produced on site. These were stuck together with more cement and helped to create the first generation of non-traditional houses. Throughout the 1960s one of the constraints on constructing buildings more than two storeys high was a chronic shortage of wood, but this was gradually overcome by better organization of imports and eventually the use of metal-reinforced concrete.

Initially the construction of new buildings was primarily aimed at providing offices for the large number of companies, including oil company services, shipping agents, importers, consultants and banks, who moved in. More office space was needed for the expanding local administration, schools and the fledgling military establishments in each Emirate. There was no accommodation available for rent anywhere in the country – the local style of living in barasti compounds was not considered suitable for most expatriates.¹³ New housing had to be provided for the large number of expatriates, who arrived – often with their families – to work in the oil industry, the banks, the military, the new hospitals, the administration and the schools.

From the middle of the 1960s, new concrete buildings also became a reality for the local population, first in the bigger coastal towns and later in the hinterland. In 1966 Shaykh Zayed took over as the Ruler of Abu Dhabi. One of the early measures aimed at improving life for the people of this Emirate was to accelerate a project started by his brother Shaykh Shakhbūt to build more government-provided housing for hundreds of tribal families living in barastis in Abu Dhabi town. More

of these so-called ‘low-cost houses’ were built at Abu Dhabi’s expense in the 1960s in Fujairah. In the 1970s the new federal government and the governments of the individual Emirates continued with this scheme of providing every family who could not afford to build their own new house with modern accommodation. In Dubai and Abu Dhabi, with the ever-expanding economy and numerous business opportunities, local businessmen built modern houses for their families as soon as they were able and local government encouraged this by providing free building plots.

Pumped water and electricity amounted to a revolution in the living standards of the population. Water was no longer fetched from the well or delivered by the donkey man, but came through a pipe into every modern house. The lives of women in particular were transformed: they were freed from the chore of fetching water and could adopt the new standards in health and hygiene which were being impressed on them. The introduction of electricity gave households not only the benefit of light at night-time but also the power needed for air-conditioning and to pump water to roof tanks, and it enabled every family to operate a radio, once local stations started up in 1969.¹⁴

The demand for electricity has increased in leaps and bounds since the first generation of power stations was built in the early 1960s in what were relatively remote locations and which are now considered the centres of towns.¹⁵ The huge combined plants of today for the generation of electricity and the production of desalinated water are sited miles away from towns and supply communities hundreds of miles away in an integrated system. The governments of the individual Emirates and the federal government are under constant pressure to plan ahead to provide enough water and power when and where it is needed. The population has grown accustomed to having these commodities available at any time – they have become an integral part of life in this country, where not long ago people were

used to going without a drink of water, let alone a cold drink.

While the local people's immediate environment, their homes and their way of living were revolutionized when they moved into modern houses, their living conditions were just as affected by the changes happening on a larger scale. In Abu Dhabi, which had a growing income from oil exports since 1962, and in Dubai, where oil exports started in 1969, a steady and increasing flow of funds was available for housing and other projects, and the other Emirates benefited – to a lesser degree – through money donated for particular projects or to the Trucial States Development Fund. Initially projects were directed from the Rulers' courts, but soon the task of bringing about the realization of the numerous and multi-faceted development plans required the establishment of governments with departments for the various specialized operations. When the seven Emirates together founded the United Arab Emirates in December 1971, federal ministries were created, which took on many of the tasks carried out previously by local governments. But today local governments have a very high profile in the development and transformation of the physical world throughout the Emirates.

People's lives were possibly most of all affected by the rapid development in transport. In the past, transport within the towns was provided by donkeys; outside the towns and in the hinterland it had to be by camel.

Opposite

A typical scene in Abu Dhabi

Below

Part of a new road at the Customs Fort, Abu Dhabi

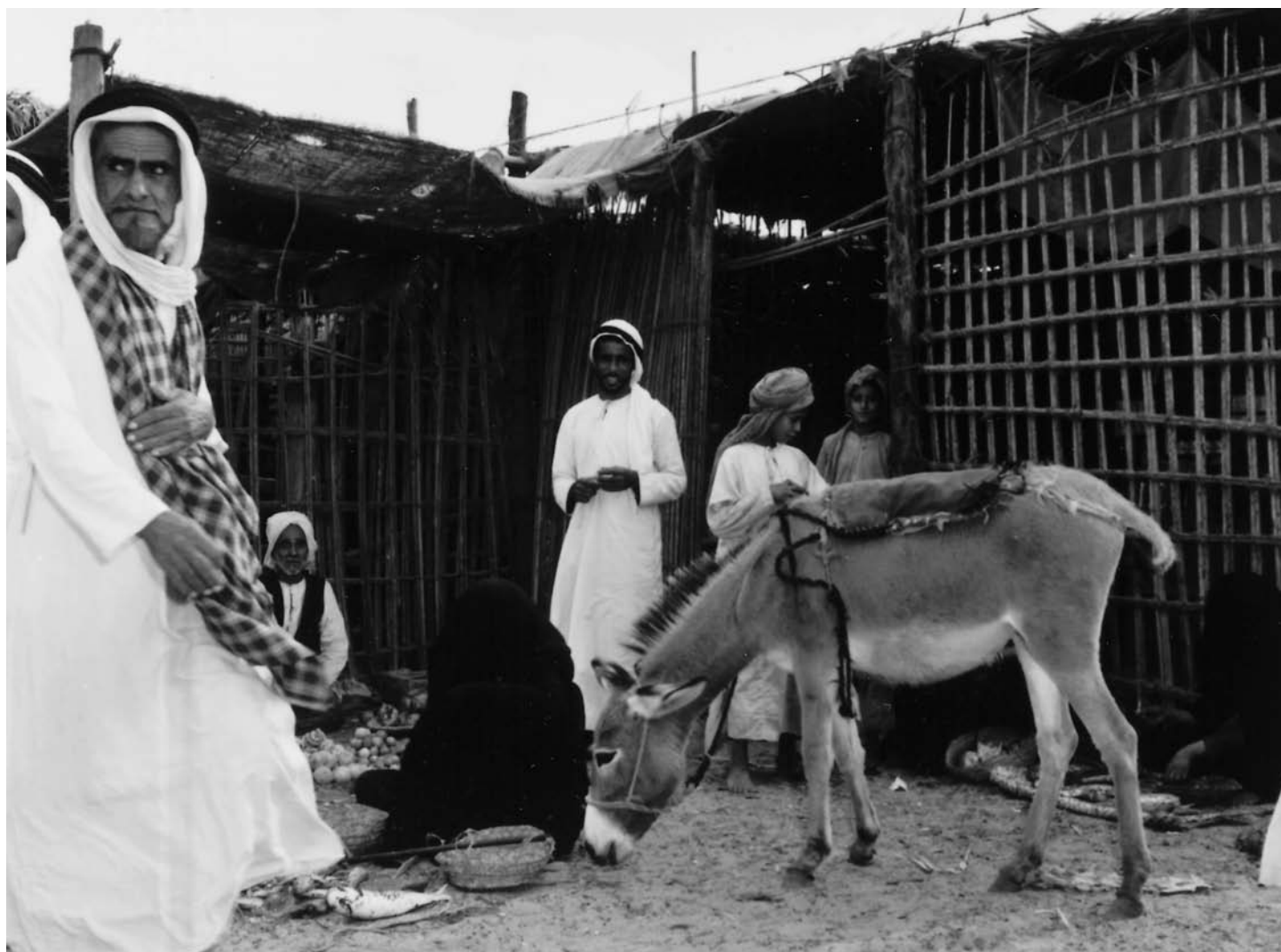
Bottom

On the main road passing through Abu Dhabi



Journeys between the Emirates and from the Gulf coast to the east coast were made by boat. From the 1930s some of the shaykhs and a few merchants imported cars for themselves and the oil companies brought in Land Rovers and desert-going trucks, but by 1966 there were a mere 100 vehicles in the town of Abu Dhabi. There was a widespread lack of roads – tracks in the sand or crudely compacted salt mud, *sabkhab*, being the alternatives to the trackless desert. The 17 kilometres between Dubai and Sharjah and the road from Abu Dhabi to al ‘Ayn were the only stretches of road constructed before federation. In the 1970s properly constructed roads began to spread out from the densely populated coastal towns to the oases, wadis and villages. At the end of the 1990s there was hardly a village which could not be reached by car, even if the last few kilometres had to be driven on a graded track rather than a metalled road.

Life was transformed by this revolution of mobility: building materials and consumer goods could be transported to any part of the country; the produce from gardens in a wadi or on the plain of the east coast could be sold in the larger markets of Dubai and Sharjah; men and women from different Emirates could take up work in an office of the federal government in Abu Dhabi or Dubai; and the University, which opened its doors in 1977, was able to be sited in al ‘Ayn because of improved communications. The proliferation of privately owned cars and cheap taxis also means that there is no limit to the lateral expansion of the growing cities. For the local population of the UAE cars have become absolutely essential. People have become accustomed to arranging their lives in a way which makes it necessary to cover great distances very frequently because they often work in one place while the family lives in another, the



children study at yet another place and everybody meets for the weekend on the family farm somewhere else again. This greatly increased personal mobility now contributes a great deal in terms of welding together the different parts of the country: while working or studying together, the people from distant Emirates and different tribes have formed the bonds that have helped the UAE to become a nation.

In some respects the people of the UAE have adapted very quickly to every phase of change in living conditions. But some aspects of modern living have only been adopted very reluctantly, the most noticeable being the issue of living in high-rise buildings. Women do not feel comfortable when they have to meet strangers, which is inevitable if a family shares lifts, corridors, pavements and parking areas with other users of a block of flats. People are used to living together with or in close proximity to the members of their extended family and are not used to living near total strangers. They therefore still prefer to live in houses with their married children, brothers and uncles all inside the same large shared compound, or to build their houses next to each other. In order to have enough space to spread out in this way, local families have tended to opt for bigger plots of land – even if it means living ever further out of town.

However, a growing number of employees, particularly those in positions in the federal government, have no choice but to live in an Emirate away from where their extended family has its roots and its family home. They are usually provided with a flat which is their home for the week, and rejoin their family at the weekend because their wives and children prefer to remain within the family compound. But, as more women move into the workforce, the more likely it is that husbands and wives will establish themselves as nuclear families and even get used to living in high-rise buildings.

The late 1960s witnessed the beginning of the total transformation of the towns and villages of the Trucial Coast – yet most of the new construction was then still sited outside the existing built-up areas. When families first moved out of their traditional homes into houses with modern facilities they usually let their old ones to groups of expatriate bachelor labourers from the

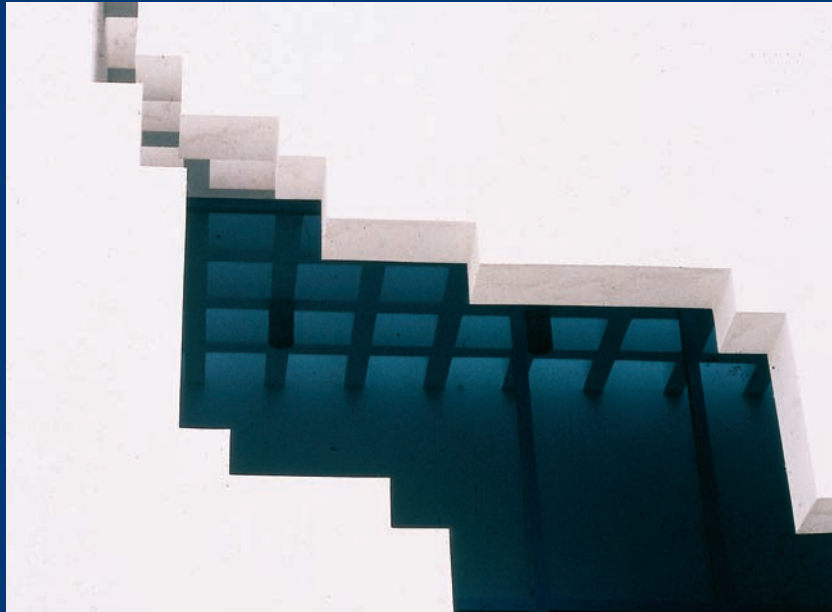
subcontinent. They did not replace the old houses in the original settlement areas at first: the new houses were built nearby – certainly within easy walking distance. But as the income from oil grew, the pace of development accelerated in every field. To accomplish all the tasks in hand, vast numbers of workers were brought into the country. They came from all over the globe and from all walks of life, from the most highly skilled to manual labourers. Soon the momentum of the change entirely consumed the small old coastal towns and they became cities, which continue to change at an ever-increasing rate.

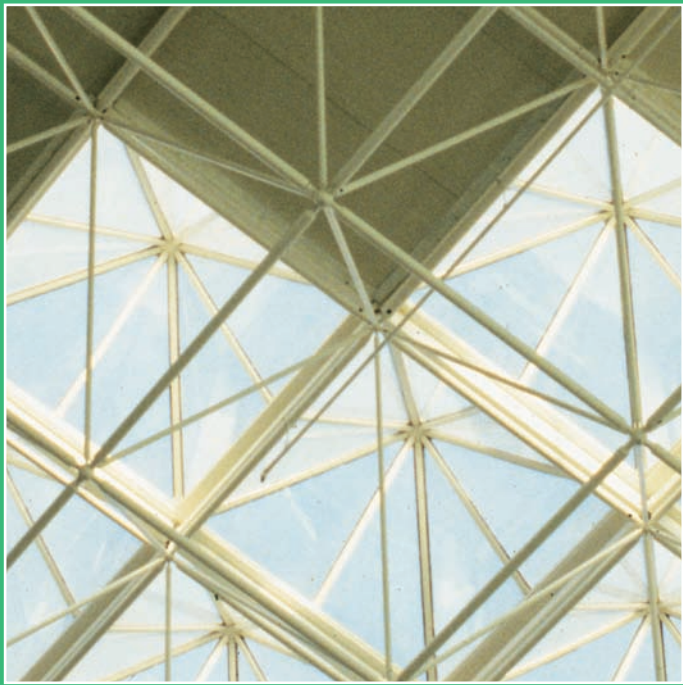
The traditional settlement areas remain the focus of urbanization. Downtown is where the local families used to live in their compounds, but they have long since moved out to the periphery of the cities. The areas where the original settlements were have become business centres, which the local people own and operate but do not occupy. It is the expatriates who live in the high-rise buildings and populate the old centres of town, which in many instances visually dominate the scene. Moving away from the location of their traditional settlements is not perceived as a dramatic loss by members of local families; on the contrary, the improvement in the quality of life is gratefully recognized by those who remember the time when water, the daily essential, was precariously short. Thus, the adaptation to the practical and physical changes caused by modern living is, for most families, the realization of dreams.





MODERN Architecture





BRAVE NEW CITIES

Architecture in context: an overview

Salma Samar Damluji

The construction of cities in the United Arab Emirates coincided with the need to create a modern urban reality precipitated by an emerging civil state structure. The original urban fabric, prior to the newly struck wealth from oil revenues, was modest in quality and insignificant in content and composition. A number of defensive forts served as palaces and abodes for the tribal Shaykhs, with attached mosques and living quarters. Houses were constructed in coral-reef rock and/or sun-dried mud brick and the traditional *'arīsh* (woven palm frond) housing. Dwellings were arranged in independent quarters, in clusters attached to oases (al 'Ayn), with the main town centres forming enclaves along the Arabian coast (Abu Dhabi, Dubai, Sharjah, Ra's al Khaymah, Umm al Quwayn) and in the case of Līwā within the desert expanse bordering on the empty quarter. The natural and original landscape, well up until the 1960s, was one of an open vast desert dominated by tribal communities that maintained a variety of traditional and shifting strongholds.

Emerging in cities of this eastern part of Arabia is a strange phenomenon, manifest in the polished concrete structures beside lush green gentrified boulevards – identifiable with an international trend for the development of skyscraper islands. The urban growth within the confines of rigid grid-iron master plans, over the last three decades of wealth investment in building, remained less deferential to the forming of a paradigm, with few conceptual references to the landscape or to the cultural and historical environs of Arabia.

The need for a polemic on Arab/Islamic style has become desperately acute in countries where there was little original reference to formal Islamic architecture to begin with. This is particularly apparent in the UAE. It is, however, surprising that, despite three decades of building, architectural style has been persistently reduced to a process of borrowing. This is most evident in surface treatments, where we find a predominant use of arches, to signify an Islamic or cultural touch. The eclectic forms used in the expression of façades, as manifested by international and pan-Arab practices, remain meaningless or contrived. Successive examples point to a practice that was at best based on the transfer of form, short cuts through imitation¹ and, where deliberate effort was exerted, often the misrepresentation of the real.

However, the wealth of Islamic and Arab architecture in the region has rarely been understood or emulated in contemporary or modern versions. This wealth is discerned in some outstanding examples of spatial design and structure: the Omayyad Desert Palaces, Andalusia, the 'Abbāsīd khans, palaces and *madrasahs*, the minaret of Sāmārā', the Mamlūk Mosque of Sultan Hasan, the Safavid Mosque of Shaykh Luṭfallah (not to mention the exceptional works of Sinān in Istanbul, or the Mughal palaces). The configuration of remaining walled cities and quarters (Fās, Marrākush, Samarkand, etc) points to a serious resource for architecture and planning. Irrespective of style and form, these examples of the conceptual methodology employed successful references and developed a sophisticated vocabulary that was based

on geometry and the resulting proportion. Interpreted in a series of architectural elements, a distinct philosophy emerges in the detailed structure of buildings, which encompasses the entire work, from the pavements through to the roof parapets. In 1975 the Egyptian architect Hasan Fathy (d. 1991) pointed to the courtyard floor of the Sultan Hasan Mosque in Cairo, and said: 'This is town planning'. The association between abstract patterns and architectural design was illustrated by Issam El Said,² in the geometric analysis he projected on the floor plans and façades of a number of Islamic buildings. The relationship of a unit which is repeated to form a pattern equates to the relationship between architecture and town planning, i.e. between the buildings and the scheme of order established in the town fabric.

The disclosed content in the subtle concept of the wall, on the other hand, in the architecture of Islamic cities can still be discerned. The wall played a major rôle in delineating the architectural composition and resulting interplay of spaces. Forbidding and defensive when enclosing cities, the *sûr* distinguished the status of a settlement as a 'city'. On the interior of the city the wall assumed other functional interpretations. Narrow meandering streets and paths are set off by the relationship of the walls and their close proximity. The bareness and austerity of the outer walls, whether in brick or stone, concealed the privacy of the interior life and a series of spaces embellished with colour and decorative features that were rarely revealed on the exterior.

The old city of Fez manifests those qualities still in its private residential and public quarters. The influence of the wall and its articulation in the plan of the town cannot be underestimated. It is after all the first element that one comes into contact with upon entering a city, a street, a *madrasah*, a mosque or a house – where it fulfils the protective and excluding function on the exterior, in contrast to the gentle and serene world of the interior. Open and closed spaces are affected by the quality and form of walls: these reveal and offset gardens, courtyards, fountains and halls. The walls are articulated by columns, arches and openings, and adorned with geometric patterns in *zillij* cut glazed tiles, stucco and carved-wood

panelling. Most important is the power that walls assume in the town plan, forging the ultimate separation between the outside world's mundane reality by virtue of withdrawing into the interior seclusion of the spaces they contain and provide.

Critical of the openness and exposure that the International Style introduced to building design in the Arab world, Hasan Fathy referred to the new style as 'façade' architecture, basically one that was committed to surface treatment. It was in this context that he defined Islamic architecture as being concerned, in his words, 'with the spaces between the walls, and not the walls [themselves]'.

The fascination of reconstructing the power of the aesthetic notwithstanding, within the region the transfer of select forms and styles was oblivious to the underlying design principles and accompanying knowledge required, to achieve the creative and graceful forms that have distinguished Islamic architectural spaces. This established a trend in cultural representation, one that strove to imitate but failed to comprehend, resulting in the displacement of any real identity.³ This explains why despite phenomenal budgets allocated to constructing grand central mosques in the Islamic world in the past two decades (for example at Makkah, Madinah, Kuwait and Casablanca), seldom have their impact and spatial qualities approached those achieved in the mosque in Cordoba (even after the desecration of this space by anachronistic modification).

This trend has been applicable to the Arab region's modern 'Islamic' architecture – a loose definition given to a poor catalogue of eclectic styles. The new style has failed to acquire the resonance of a school of architecture, inherently viewed as the result of subtle genius which was established by successive Islamic dynasties. Formal cities and monuments of power aside, the vernacular architecture and the urban fabric of towns and quarters constructed in mud brick, stone and shale in neighbouring Arabia merit equal consideration. The planning that went into the construction of traditional high-rise cities, which continue to function in places such as Şan'a', Yāfi' and Ḥaḍramūt in Yemen, presents an urban reality that is challenging to explore for modern development.

The choice made by new countries in constructing new cities can no longer be assessed within the narrow confines of each locality or in isolation from a complete opus of an Islamic or Arab architectural and vernacular urban heritage, and irrespective of the desire to define the nature of a national attitude as modern or advanced in outlook. The ‘transfer of technological progress’ should not necessitate the elimination of cultural values and the consideration of specific functional and aesthetic content in the design and planning of towns and cities. The basic understanding of the architectural vocabulary and principles of design that Hasan Fathy tirelessly advocated drew on essential concepts. For this he was dismissed by the professionals and modernists as a populist and nostalgic builder for the poor. His work (including writings that he produced from the mid-1940s and up to the late 1980s) effectively provided an alternative school of thought for designers and architects in the Arab world, who were struggling with the cultural vacuum brought by the urban transformation of its modern society.

The Arab city, if it were to be defined today, could subscribe to the criterion of a lost city. In a conference held in the Palace of Charles V in Granada,⁴ none of the participants recalled in any of their deliberations that we were only metres away from the Jannat al ‘Ārif Summer Palace (literally ‘paradise of the gnostic’, translated as ‘Garden of the Artist or Architect’, and ‘Noblest of Gardens’,⁵ but better known by its Spanish name: Generalife) and actually next door to the El Comares Palace of Muḥammad V. Perhaps this was but a reflection on the condition of contemporary Arab urban societies, whose material history is either too familiar, or too complex, to acknowledge.⁶

A review of the architecture of the cities of the UAE becomes compelling in view of the context and scenario that has emerged. As an important undertaking, this was accompanied by an open licence for architects and their clients in the development of these cities. The possibility that either will assume the intellectual responsibility to respond to some critical points of view that UAE nationals are beginning to develop, vis-à-vis their new cities, is still remote. An Officers’ Club constructed in the desert, the size of a town, is an interesting case in

point. The arbitrary interpretation of the desert and the Bedouin tent resulted in a mega-concrete shell form. An orientalist romantic view is here replaced by a materialist vision of outer space, an extraordinary technical engineering feat of vast proportions. The architect described the design he conceived, for the 75-hectare site, as a fixed tent and the project as a temple of progress. The first concept is anachronistic and the latter a contradiction in terms, particularly when contemplating monuments of Islamic civilization and the temporal meaning of cities and architecture to Arabs.⁷

Upon this open ground of architectural intervention and in the absence of physical boundaries or no restraints, the original development agenda may have been met three decades later. However, the true destiny of these cities clearly remains subject to interpretation and to the conditions of change.

Paradoxically, the absence of a strong traditional background in vernacular building, and a cultural reference to implicit environmental criteria, did not inspire the vision for an abstract and modest expression. The response to the austere barren landscape and the dramatic backdrop of the desert sands contrasted with the clear waters of the Arabian Gulf, combined with a conservative social context, was rather dull. Mute walls, blind arches, small openings and a minimalist approach that may have developed within a particular style, irrespective of the source of influence – modern, classical, European or Islamic references – remained absent in the development of mainstream architectural vocabulary. Interesting attempts of the concept of the enclosing wall were successful in the work of The Architects Collaborative (TAC) (Library and Cultural Centre), the Ministry of Finance and Industry (Jafar Tukan Partners) and al Khaldeya Coop (Planar). The impressive solid design of the first was the closest to being a project with genuine interpretation and serious consideration for the Abu Dhabi urban environment.

Instead, the measure of expressing the wealth in the architecture seemed to become the main criterion used by the architects/designers to impress, and please, the client. The excessive use of marble and granite in public buildings, and particularly hotels, echoed lavish building

materials typical of the excesses of Capitalist architecture in the 1980s.

The problem facing a formal critical analysis of new cities in the context of the UAE lies in presenting a specific case that is only comparable to other new Gulf states, and in particular those that did not have a strong urban heritage to begin with like Kuwait or Qatar (as opposed to Bahrain, Oman and Yemen which all possess an historic urban fabric). By comparison with the planned 'new cities' of the West, the very conditions of industrialization which produced them were not present in the UAE. Furthermore, and on the international level, no conceptual references have been made, within the 'oeuvre' (to borrow Lefebvre's expression in referring to the city as a 'work of art'), to the substantial experience of city architecture and town planning, albeit in line with the skyscraper cities of Chicago or Manhattan. On a conceptual level, a response to the critical discourse on modern architecture and cities in the last two decades has been considerably lacking.⁸

In the absence of formulating an architectural ethos the conditions were not available for creative work based on a specific environmental criterion and cultural reference, where architects can develop distinctive approaches and an emphasis on a high level of conceptual inventiveness. As a result, the UAE has not produced a particularly interesting opus of modern architectural edifices, despite the opportunity to exploit an exceptionally rich oil economy combined with a liberal structure which underlies a unique State–client relationship. The lasting relevance of any architectural or urban work in the built environment of the city shows how conceptually challenging it is. Amidst the built environment few examples of serious architecture can be singled out and distinguished from flashy commercialism. The latter has inevitably been accompanied by dire consequences. Modern architecture may have allowed architects to become less deferential to the environmental context, especially when the built environment is new and based on one that lacks distinctive natural features. However, this has not impeded the innovative process in modern architectural thought and design as practised in cities across Europe, where some interesting examples have

occurred, particularly in situations annexing a classical period fabric with new extensions (the Louvre in Paris, the National Gallery and the Royal Academy in London).

The problem also concerns cities that do not relate to any pre-industrial base, but emerged instead out of the very urgent demand for an urban structure, infrastructure and civil context to entertain and house an industry based on the wealth processing of oil revenues. This began in the 1960s and was exacerbated by the oil boom in the 1970s, a time, internationally, when modern city and town planning was under considerable review in debate and reassessment. Consideration of the interesting influx and interaction that could have taken place between Western and Arab architectural thought against the abstract and spartan environment of the Arabian Gulf should not be underestimated or dismissed. An interesting architectural and art movement had broken through in Iraq during the 1960s, where a regional style fulfilled both an avant-garde modern style and a rather successful framework on the functional and aesthetic levels. Incorporating traditional materials and craftsmanship, the designs took into account the social and climatic criteria of the environment. Concepts became rich in cultural expression and deferential to the existing elements of formal design, including the enclosed garden, courtyard and blind walls that opened onto the interior. In the 1960s the architectural practice Iraq Consult achieved these qualities by incorporating an attractive and meaningful vocabulary in the design of multi-storey offices and public, private and commercial buildings in Baghdad.

This was not without precedent for in the 1950s Gropius, Le Corbusier, Frank Lloyd Wright and Doxiades were invited to Baghdad to work on separate schemes that included a master plan for the new Baghdad University (TAC 1957) in al Jadriyah, a sports stadium (Le Corbusier 1957, constructed in 1979) and a housing scheme that Hasan Fathy worked on with Doxiades.

After several trying experiences beginning with the construction of Gournā in the 1940s, followed by a series of setbacks after the completion of the village of Baris in the Khārjah Oasis, Hasan Fathy found little reception for

his projects or his philosophy for housing the poor in an architecture based on vernacular building materials and inspired by attractive design solutions. By the 1970s, however, he was designing villas for the wealthy and the élite of Egypt and Saudi Arabia. As an institution in his own right (and in a league of his own), he had a valuable contribution to make both conceptually and culturally on the level of Arab and Islamic architecture. His legacy became established in the West, long before it was acknowledged at home. During the late 1970s and 1980s architect Abdul Wahed al Wakil carried Hasan Fathy's ideas further by fully incorporating modern building construction techniques while not losing sight of the rôle of creative design in the concepts and elements of Islamic, Egyptian and Arabian vernacular architecture for both public and private buildings in Saudi Arabia. The series of mosques he built involve the most integral design work to date, innovative on the conceptual principles and the construction demands of modern Islamic architecture.

In the UAE both John Harris⁹ and Muḥammad Makiya, as in Oman,¹⁰ contributed to the modernization and, in particular, rehabilitation of the vernacular. However, their efforts remained confined to a select number of projects dominated by the rest of the city. Diwān al Amīr in Dubai (Harris), close to al Bastakiyyah old housing quarter, is a particular case in point, as the rest of the quarter was until 1998 very neglected and in a squalid condition. Similarly the Ḥuṣn Palace in Abu Dhabi and Shaykh Sa'īd Āl Maktūm's house in Dubai (both by Makiya) stand as restored and renovated vernacular edifices quite estranged from the surrounding urban fabric. In the case of the latter, Shaykh Sa'īd Āl Maktūm's house, the whole quarter of al Shandaghah was removed.

A special issue of the *Architectural Review*¹¹ was dedicated to the UAE in 1977. In their introduction the editors, Sherban Cantacuzino and Kenneth Brown, identified two problems: firstly how seriously underpopulated the UAE was at the start of the oil boom (and still is considering the low ratio of national to expatriate population), and secondly the 'more fundamental and widespread ... problem of wealth'. They added, albeit

presumptuously or apologetically, that 'Despite the great ancient cultures of the Middle and Far East, today none of the countries which belong to those cultures can, when under the pressures of development, proceed on any but Western models, for the simple reason that only the West has so far experienced the process of industrialization'. The implication of this was clear in that the Western package and mode of urban development was a ready-to-export commodity that entailed less responsibility for cultural research, since a model (irrespective of how appropriate it was) already existed. This attitude was the product of a Capitalist ethos that has dominated architecture, where 'wealth has become synonymous with industrialization' and has found its expression in consumer culture and junk architecture.¹² The Middle East and East in general were not compelled to import the Western mode of urban planning in the 1960s and the 1970s because of a cultural vacuum or a lack of resource, but rather out of a preconceived economic mode of operation dominated by the international market.

In 1982, Iraqi architect Rifaat Chadirji addressed the impasse that international architecture had reached in a paper he delivered at the Royal Institute of British Architects (RIBA) in London by saying: 'Since World War II, billions of pounds have been poured into the construction industry in the Middle East ... the end result is embarrassing and frustrating, economically disappointing and culturally a fiasco.'¹³

A change of heart set in nearly two decades later when, in the opening Comment of the March 1998 issue of the *Architectural Review*, on the Middle East,¹⁴ the editor acknowledged that Western systems, promoted in the architecture and planning of the Middle East, have nurtured unfavourable results in the ecosystem. We are reminded that 'The glass towers and motorways of the West are ridiculously polluting and energy wasting in temperate climates. Pasted into hot, humid, desert and violently fluctuating climates, they become much worse. It is completely absurd, for instance, that in places blessed with abundant ambient energy from sun and wind, buildings seem designed to use almost as much irreplaceable and polluting fossil fuel as they can, partly to show how progressive and thrusting they are, and

partly because in many places the stuff comes up out of the very earth ...' This was a cry of consideration from the propagators of the same system that zealously encouraged exploiting the very oil wealth of the Gulf states and was attracted to seizing the possibilities and opportunities it offered professional Western practices.

Earlier in the article, the complex architectural fabric of Middle Eastern cities is described almost regretfully as having been 'intimately mixed in a highly sophisticated and tight spatial matrix which worked extraordinary well ... Integrated, delicate and coherent hierarchies of form and space, monumentality and the quotidian resulted.' These relationships along with the urban fabric, the editor continues, 'have largely been destroyed – blown apart by the Modern Movement ... Whereas in the West the Movement's obsession with detached structures was bad enough, in the Middle East it was disastrous. Once the complex coherence was eroded, each building could speak (or rather shout) for itself: indeed it is almost necessary in modern capitalist societies for it to do so. The languages [we are reminded] in which those buildings shriek at us and each other are primitive and almost gibberish.' Invariably, and across the contemporary, lush oasis covering the larger part of Abu Dhabi Island's sands, the new developments and international ventures of the last few decades stand mute and somewhat indifferent to their surroundings.¹⁵

Similarly, braving a walk along the wide open boulevards of the new cities of Dubai or Abu Dhabi simply reinforces a hollow fact: there is no language. The buildings can hardly communicate with their own internal space, making it impossible for them to communicate with those who use them or their surrounding environment. They stand instead akin to foreign casualties, a monument to innate matter. 'Despite the onset of a soulless international urban era, characterised by heavy construction methods using reinforced concrete and steel, built structures that suggest permanence and an imposing architecture which dominates the landscape, the qualities attached to the ways of life of both the Arab and the desert remain inherent.' As a response, perhaps as a silent attempt to counter this self-inflicted cultural aberration,¹⁶ it is interesting to note that the Abu

Dhabi–Dubai highway is posted at regular intervals with small and touching hand-made signposts on the grass verges in cursive Arabic script that read: 'Remember Allah'.

Contemplating this phenomenon one cannot but recall the Prophet's words:

'The truest verse uttered by the Arabs is Labid's saying: Is not everything devoid of Allah untrue[?]'

Qāshānī gives us the continuation of the verse, which is less commonly quoted: 'and every luxury [is] ephemeral'.¹⁷

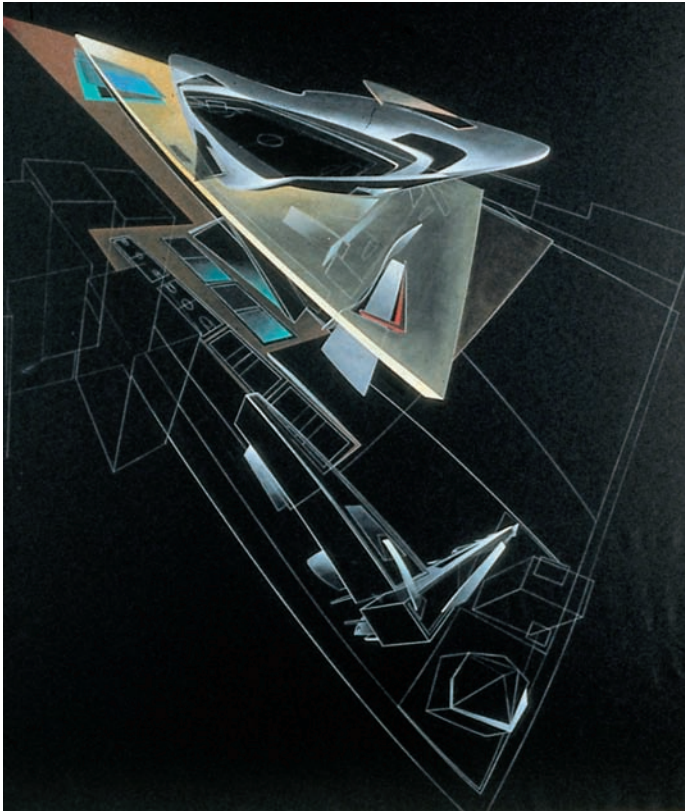
Ibn al 'Arabī went further by identifying the meaning of space when he wrote, 'Places have an influence upon subtle hearts.' He illustrated his point further by drawing the description for a great distinction between 'a city whose architecture is [made of] desires and a city whose architecture is clear [eloquent] revelations'.¹⁸

On the Western front, entertaining a Utopian vision could have turned the Gulf cities into interesting architectural places for design and innovation. Unfortunately, and but for a few names in the international arena, TAC, Kenzo Tange, Aeroport de Paris, Arthur Erickson, Fitzroy Robinson, Carlos Ott, Leo Daly ..., this did not materialize. Hardly any interesting attempts have been advanced on the concept of the enclosing wall since the successful work of TAC (Library and Cultural Centre).

The Western model has furthermore precipitated a skyline competition, where striving for ever taller towers has become an obsession. This was achieved irrespective of style or trend, in flashy commercial buildings. More recently, this quest for height became increasingly evident in the ascending minarets of grand state mosque projects. The latter became a common phenomenon throughout the Arab world, for example where the height of the minarets of the mosques of the Prophet's Holy Mosque at Madinah (new extension completed in 1994) had to be elevated in order to compete with that of the King Hasan II Mosque in Casablanca (completed in 1993). More significant is that the construction of the minaret in the mosque is reduced to a mere symbolic function. The analogy between minarets and skyscrapers

is important because it raises the very serious question as to whether there still remains a distinction between the principles and values applied to the design of spiritual places and those incorporated into commercial buildings. It is clear to see that neither the wealth of the architectural heritage extant in the Islamic world, nor the gracefully ascending elegant Ottoman minarets were genuinely contemplated for design purposes.

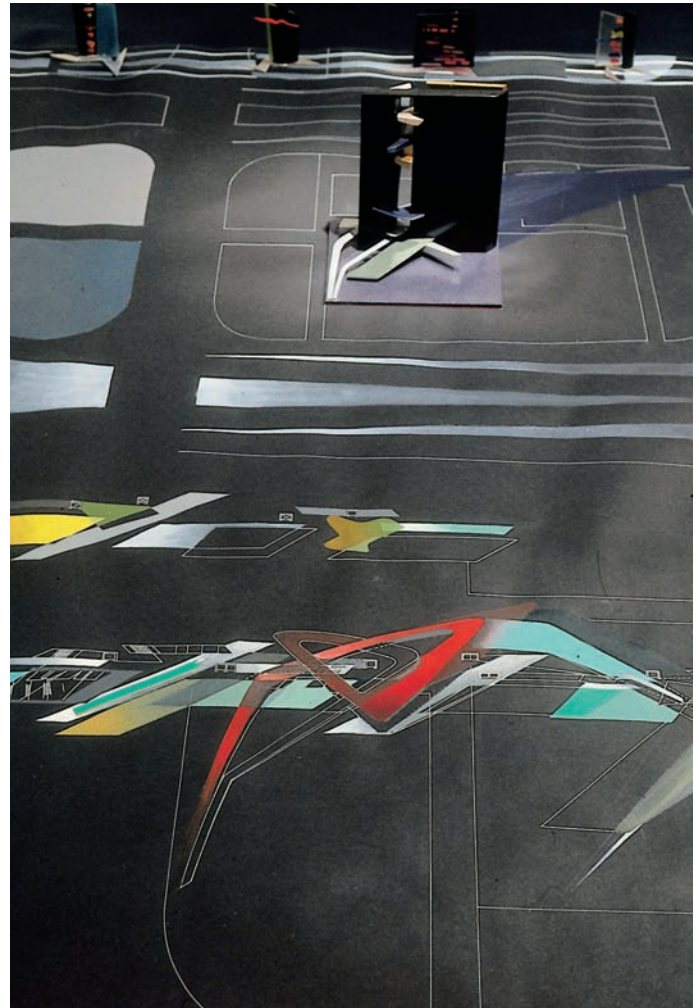
The other question related to height is why vertical expansion is necessary when the Emirates are still underpopulated and land is available. Naturally, land and property speculation became the major determining factor. Furthermore, the city of Abu Dhabi is built on land reclaimed from the sea. There is essentially a reliance on contracting and engineering firms with inadequate professional backgrounds and experience in design, architecture or town planning, who have engaged in a lucrative and speculative enterprise which now



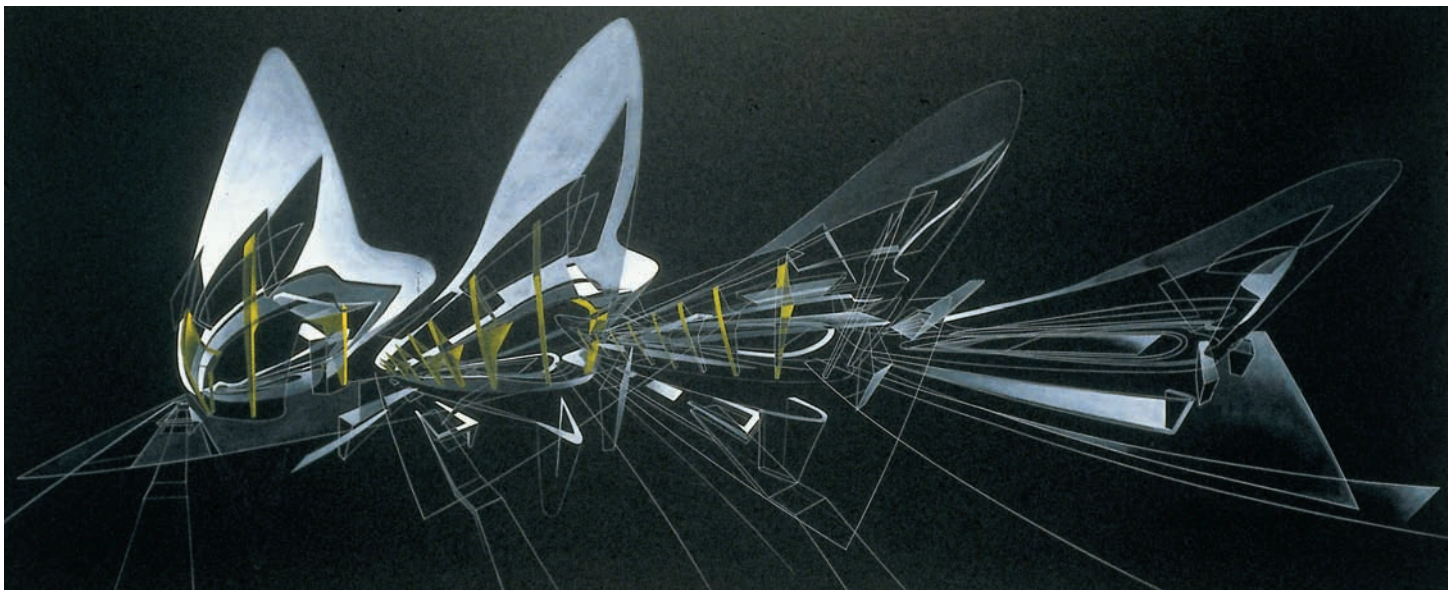
Above
Exploded aerial view of an entry in the Al Wahda Sports Centre Design Competition, Abu Dhabi. The podium, seen as a new landscape level or suspended park, provides access to the stadium as well as overall viewing of the sports centre activities. The stadium itself, rising out of the shifting ground plane and podium, allows for a variety of seating arrangements and flexibility of use due to the free-form characteristic of the design and layout

dominates the building sector market entirely. National capital investment in construction resulted in funding a thriving commercial not architectural practice which institutionalized and harboured urban mediocrity.

This nurtured that typically unmonitored form of construction that unmistakably manifests itself in the majority of cities. The recent deterioration that ensued in the buildings of the 1990s is illustrated in building façades, where striking colours of reflective glass (pink,



Above
Site plan and enlarged floor plans; painting and model for a hotel/residential complex, Abu Dhabi. The project is located on a prime site in the centre of the capital. With Abu Dhabi organized on a grid the architects used this uniform structure as the basic design principle of the project. The grid appears flipped as a vertical plane (the slab of apartments and hotel rooms) which becomes the backdrop of the special hotel-related spaces such as conference rooms, restaurants and a health club. These are sculpted individually and suspended in the void where the slabs split apart. On the ground floor a three-storey beam cuts across the site and through the slab, accommodating the shopping mall and offices on top. Only above this beam, on the fourth floor is the hotel lobby which is accessible for vehicles via a curved ramp swooping from one corner of the site around the slab and into the vertical courtyard (the split). The entrance lobby at this level allows for a vista on the Gulf



Above

A rotation painting of Al Wahda Sports Centre, Abu Dhabi. The design re-interprets the sports centre as a large-scale landscape relief. The project is composed of the podium viewing park and its integration into the new ground plane and stadium. The new ground plane rises from the street level, surrounding the existing buildings, and slips under the podium, at which point all public access and circulation routes disperse to the various programme elements

green and bronze) are used to clad the curtain walls of the proud steel-frame structures.

However, interesting developments are taking place. Zaha Hadid was invited to design three projects for Abu Dhabi: al Wahda Sports Centre in 1988 (a sports complex including a main stadium accommodating 10–12,000 spectators, indoor sports hall and ancillary facilities) followed by a hotel/residential complex, a mixed-use development including offices and shopping mall, in 1990, both projects on hold to date; and a design for the National Museum of al ‘Ayn, 1988, which was similarly not carried through. More recently a design for the Abu Dhabi New Third Bridge Crossing project, 1997–99, was approved and is currently going ahead. The new bridge is part of the development and completion of the road system linking Abu Dhabi Island to the mainland. The location of the bridge, on the west side of the creek, is by the equestrian centre and marina. The opposite bank lies on the east of the creek mouth with the Maqta‘ bridge along the south creek shore. This will probably prove one of the most promising architectural projects in the capital to date, considering the general inertia brought on by the urban environment dominated by the solid vertical mass.

On a very basic note, architects practising in Abu Dhabi tend to agree that the shortcomings of the city, in the absence of any architectural or philosophical polemic, are characterized by the fact that the town plan of Abu Dhabi has no axis or nucleus for its orientation. Subsequently, there is no planning of quarters or zones or zoning to locate public and ministerial buildings. By the 1990s the buildings that were constructed as late as 1976 and 1980 were already being pulled down and reconstructed, due to the inferior quality of building materials and the use of salty sea water in the cement mix. Parking spaces were not allocated in the town plan and no provisions for parking spaces were made. The broader polemic lies in working against nature in terms of building the city of Abu Dhabi on reclaimed land, with a water table of 1.5–2 metres below sea level. The corniche of Abu Dhabi has turned into a concrete wall of buildings on the sea front, thus obstructing ventilation for the rest of the town and cutting it off from the openness of the sea.

Building still represents a major economic investment of the country’s revenue locally and is used as an incentive to encourage capital investment. This may also explain the avid reconstruction spree that has set in since 1990 after the Gulf War while the search for a cultural identity after the oil era still continues. An understanding of how the system works may be useful.

Abu Dhabi

HH Shaykh Khalifah Bin Zayed Al Nahyan believed in the necessity of securing the means of welfare and social justice for the people, to compensate them for the years of past hardship they withstood with patience exercised without despair, and defiance that never faltered in difficulties ... He enlisted Arab skills and expertise which have contributed, and still contribute, to this monument of civilisation ... realised on the Emirates soil. (The Khalifah Committee)

Abu Dhabi has a unique social system which was set up to administer the investment, funding and construction of building projects by advancing loans on behalf of its citizens, and effectively funding building projects in the commercial sector of the city. In other words, national capital is channelled to finance each building project in order to facilitate the ownership of property by its citizens.

The Department of Social Services and Commercial Buildings (DSSCB), which originated as The Khalifah Committee, was set up by HH Shaykh Khalifah Bin Zayed when he was the Crown Prince.¹⁹ It was set up in 1981 to act as the main professional national institution appointed to oversee and approve commercial and residential building projects in Abu Dhabi.²⁰ The rôle it plays in the development of the urban sector can hardly be overemphasized. It is essential therefore to examine the procedures and directives of this organization in order to understand the factors affecting the construction of the city of Abu Dhabi in particular.

Each commercial building project is financed by the Department, on the Government's behalf, by granting every national owner a loan. The high-rise buildings, identified as 'commercial' projects or buildings, include two floors for commercial use, while the rest of the floors are rented out as residential flats.

Preliminary approval for the building is given by the Diwān of Shaykh Khalifah to grant the loan for the specific project. This makes the Department the overall vital and essential body in terms of approving the building finance, construction activity and the nature of projects implemented, including the details and specifications of the building, through to the completion and letting of the building floors on behalf of the client. Therefore 95 per cent of Abu Dhabi's buildings are legally owned by the Department, since it functions as the finance channel for the projects, serving as the link between the funding source (the Diwān of Shaykh Khalifah), the client or proprietor, the consultant/architects and the contractor.

Once the preliminary approval for the building loan is granted by the Diwān, a consultant is appointed with the approval of the client (owner) from a list of 400 consultants registered in the country. 'Consultants' represent the private offices of architects and structural engineers. Alternatively the client can select the consulting office whereby the Technical Section of the DSSCB then commissions and appoints the consultant. The consultant then submits the required work schedule and programme, in order to secure the basic finances, for the approval of all departments concerned (within the DSSCB). The consulting office will then prepare the preliminary design. This is put forward to the Technical Section for approval so that the consultant can then

proceed to the detailed design stage. The client would be involved at this stage by specifying his requirements to the consultant. In cases where the client does not have enough expertise, consultants work with the Technical Section on the design and building finishes to enable the Technical Section to control costs on the loan to be paid. Building drawings have to comply with the bye-laws provided by the Department of Town Planning and with any restrictions on the design and structure, for example safety, heights, façades, openings, access and infrastructure.

Once this phase is completed by the consultants, the drawings and project file are submitted to the Design Review Section to be checked for approval. This section is formed from a pool of some 34 engineers and three to four architects whose job is to check the drawings for the safety of the structure and compliance with the bye-laws. This stage is followed by putting the building for tender through public (newspaper) announcement. This process, from going out to tender until contractors submit their study proposals, takes a month and a half.

The tenders are then transferred to the Technical Section to review the cost analysis and specifications submitted by each contractor. Following the Technical Section's recommendations the tenders are referred to the Awarding Committee. This Committee, a higher body including the Chairman and Under Secretary, meets on a twice-weekly basis to open the tenders. Decisions for awarding the tender are normally based on the contractor fulfilling general project criteria related to the quality, costing and delivery of work. Generally, and once these conditions are fulfilled, the lowest bidder is awarded the contract. Once the Committee has decided to whom they will award the job, the Committee members write to the Shaykh Khalifah Diwān to arrange for the finance. The Diwān normally finances the complete job; however, in some rare cases, according to a local architect, 'they may grant say 50 million and ask the owner to come up with say 20 million'.

The agreement between the contractor and the DSSCB is carried out through the Legal Section. A mortgage deed is forged between the owner/client and the DSSCB. A letter of job commencement is then

issued to the contractor on the second day after the mortgage deed has been signed.

The average duration of this procedure is six months up to the tender stage, six weeks for the study of the tender submitted by contractors, two weeks for analysis of the tenders submitted and for awarding the job. The Diwān's response can take from one to six months, since the approval of each project is subject to the signature of endorsement of Shaykh Khalifah in person.

The procedure thereafter involves the contractors commencing the work with the supervision of the architects/consultants. Engineers from the Technical Section check the execution, quality of work and schedule of payments submitted to contractors, which are referred to the Abu Dhabi Financial Department (that is responsible for all Governmental money in Abu Dhabi) to initiate payments.

Once the building is finished, a Committee of Engineers is appointed to check, report any observations or comments and take over the completed project. The keys to flats, shops and offices are then handed by the contractor to the Technical Section. These are then referred to the Leasing Section with details of the building description (number of shops, facilities, amenities, flat details, services, air-conditioning etc.). A committee from the Leasing Section fixes rents and generally allocates building spaces to existing rental requests, managing the administrative and financial aspects of the building. The Technical Section remains in control of the building for a period of one year after completion, considered a 'maintenance supervision' period, after which the final settlement of 5 per cent is made to the contractors. On final settlement, engineers from the Technical Section go out to check the building maintenance. At this point the responsibility of the building is released from the Technical Section and transferred to the Maintenance Section of the DSSCB.

The repayment of the loan by the client is secured through the rents and commercial returns of the building, which could take up to six or seven years. (Precise information on the nature and duration of the loan repayment would have to be obtained from the Financial Section of the DSSCB.) Distribution of the building's

revenue runs according to a percentage allocation quoted²¹ as follows:

The national landlord is given 30% of the building's revenue if it is an apartment block, and 40% if it is a villa structure. 60% of an apartment block's revenue, or 50% of a villa's revenue is apportioned for bond repayment. It must be noted that the bonds are interest-free.²²

The objectives and philosophy of the project for setting up the DSSCB are also highlighted in the above quoted document, along with the essential statistics for the number of residential and commercial projects listing the Department's achievement, with the value cost of those projects, as it evolved between 1981 and 1995.

The impact of modern architecture was discussed in January 1996 along with the development phenomenon that marks the urban planning of Abu Dhabi. This is based upon a continuous planning process that commenced in the late 1960s. The comprehensive master plan for Abu Dhabi, and a regional plan for the UAE, enabled the master plan for al 'Ayn to be consolidated

within the latter. The idea to tie in al 'Ayn in an integral plan with Abu Dhabi had been suggested at an earlier stage. However, this was abandoned in favour of two separate master plans. The rôle of British planning companies in the late 1960s was mentioned.

The Architectural Section of the Abu Dhabi Municipality and Town Planning Department is responsible for setting the criteria for consultants to determine the form of buildings and façade designs and instill or incorporate Arab/Islamic architectural influences into the modern building designs. This particular requisite is the responsibility of the Heritage Section of the Municipality. Despite several visits and requests, information was not forthcoming on the nature of directions in the housing and town planning schemes and procedures, the rôle of the architectural heritage and influences of Islamic features that the town plan of Abu Dhabi recommends.²³

Below

Panoramic view of a segment of Abu Dhabi's skyline from the Baynunah Hilton's tower, showing the line of new buildings constructed in the last decade along the corniche front. In the foreground is the Abu Dhabi Grand Mosque, behind which is the meat, fish and vegetable market





Top and left

Al Omairah ('Umayrah) Residence, in al Buṭayn residential quarter: details from the entrance and part of the exterior wall forming a screen outside the main living area (Arkan Architects and Consultants, Abu Dhabi, 1985)

Above

Close-up of the sea-facing façade of the Meridien Hotel, Abu Dhabi

The city of Al ‘Ayn

We order all specialised parties in the departments of the Municipalities and town planning and works to ensure that the designs of public, private and service buildings, whether carried out by your institutions or commissioned to consultants, reflect the Arab/Islamic architectural style and the historic civilisation of the region. No building permit should be issued unless the building qualifies in this style. (Zayed Bin Sultan Al Nahyan)

The city of al ‘Ayn, in the eastern province of Abu Dhabi, is considered one of the oldest in the Emirates, with a historic urban heritage and rich cultivated land within its urban fabric due to the lush ‘Ayn Oasis. There are 64 public gardens in al ‘Ayn. The oasis has the largest supply of underground water in the Emirates. In 1977 this was reported as sufficient to irrigate an area of 30,350 hectares.²⁴ Al ‘Ayn was the previous seat of Shaykh Zayed who was governor of the eastern province from 1946 until he took over from his brother Shaykh Shakhboub in 1966.

Al ‘Ayn contains a number of interesting traditional forts, and amongst the finest vernacular architecture constructed in mud brick, most prominent of which is al Jähily fort.²⁵ The oasis, however, with its lush date gardens, remains the most impressive landmark of the city.

The new development project of the al ‘Ayn Oasis proved one of the most interesting projects undertaken by the Municipality in understanding the urban morphology of the city. The oasis is composed of date palm groves that have been separately walled in by brick *sūrs*, with narrow winding paved streets shaded by the towering trees. The tangible planning qualities achieved here amount to an abstract representation of the lost Arab city. The pleasant climatic and ecological conditions of such an extraordinary environment, to which

traditionally the inhabitants of al ‘Ayn resorted in the hot summer season, may be drawn as a model not only for landscape design but, on the complex conceptual and organizational level, for consolidation in urban planning. The walled natural gardens of palm trees appear aesthetically and climatically blissful, and in marked contrast to the over-constructed urban centre occupied by towering steel-and-concrete frame buildings.

The composition of the architectural landscape serves as a substantial reflection upon the organic and natural elements, which every urban environment deserves to contain. As an integral entity, it pays respect to elements of proportion and the human scale, as creatively achieved in the planning concepts of this interesting development. This clearly includes the nuances of closed and open spaces within the plan while the fabric of the enclosed oasis, existing on the edge of the city’s urban centre, remains so well secluded on the exterior and generously revealing on the interior. Several mosques off the main streets have been preserved, and one local café has been constructed in the traditional ‘*arīsh* palm fronds in the main square. A single car may travel into the shaded empty lanes comfortably. The original housing of al ‘Ayn developed in mud brick and ‘*arīsh* around the oasis, while the forts and *ḥuṣṇ*, constructed out of mud brick, were inhabited by the

shaykhs. It is interesting to note that land in al 'Ayn, whether intended for construction or cultivation use, is free. The Municipality performs an effective rôle as the practical local authority involved in and attending to the direct needs and requirements arising from the relationship of the inhabitants with their city.

In 1988 the Committee for the Preservation of the Arab Islamic Architectural Style was formed. The responsibility assumed by this committee covers studying each building proposal separately to evaluate its functional and aesthetic aspects with reference to Arab/Islamic values and concepts of architectural design. The committee's approval is necessary prior to approval of the architectural drawings.²⁶

The experience with the ongoing planning process which this necessitated highlighted the disadvantages of the speed with which such planning is executed. The analysis and critical awareness of such shortcomings, as far as this writer is concerned at least, indicate a positive attitude in the understanding of the urban fabric development and the sensitive issues related to it on a multi-disciplinary level. The system of 'consultant' practices which operate and effectively control the architectural projects 'market', while not necessarily possessing design competence, has had considerable impact on the quality of 'modern' architecture. A comprehensive master plan for the region of al 'Ayn was drawn up in 1985 and updated in 1996.²⁷

Development budgets and projects are allocated by the Executive Councils representing the Government of each Emirate. Al 'Ayn is part of the eastern region of the Emirate of Abu Dhabi, ruled by Shaykh Khalifah through his representative Shaykh Tahnūn, and governed from Abu Dhabi, with an Executive Council chaired by Crown Prince Shaykh Mohamed. Al 'Ayn Municipality has its own administrative structure, boundaries and responsibilities, but the Council allocates the development budgets, along with those for Abu Dhabi itself and for the western region (Līwā, Bida' Zāyid and the adjacent areas), these being the three principal regions of the Emirate. However, the Municipality has the freedom to initiate the projects and submit them for review and approval by the Council. Although the Municipality does

not actually cooperate with Abu Dhabi on any projects, the joint implementation of certain special projects takes place at the request of HH the Ruler Shaykh Khalifah: for example, the levelling of a desert area to construct a housing complex. The Abu Dhabi municipality may not have the financial and technical capacity to implement the project alone, so the heavy equipment and manpower may be provided by the Municipality of al 'Ayn, even though it is outside the eastern region.

Al 'Ayn is also home to the University of the UAE, until recently the only university in the country. (In 1997 the American University of Sharjah was opened.) The rôle of the University in architectural education is rather lacking in terms of design and urban planning. The courses on offer are oriented towards structural engineering. This will ultimately need to be rectified to suit the direction and influence which a professional training should have on forming future generations of local architects, who need to be aware of the complex issues related to the development of architecture on both the international and national level, and the integral rôle that architecture plays in the urban fabric and renewal. This will not be an easy task, since the University is only at the early stages of acquiring a national base in terms of the curriculum and the specialized teaching board.

A recently completed project was the impressive building of the Faculty of Medicine at the university. The design is seen to embody modern 'Islamic' features in the building by incorporating various elements used in the façade along with the design of a series of courtyards in the layout.²⁸

Opposite

Top left

Faculty of Medicine, al 'Ayn University (Perkins and Will International, 1997–98)

Bottom left

View of one of the courtyards attached to the main building, Faculty of Medicine, al 'Ayn University

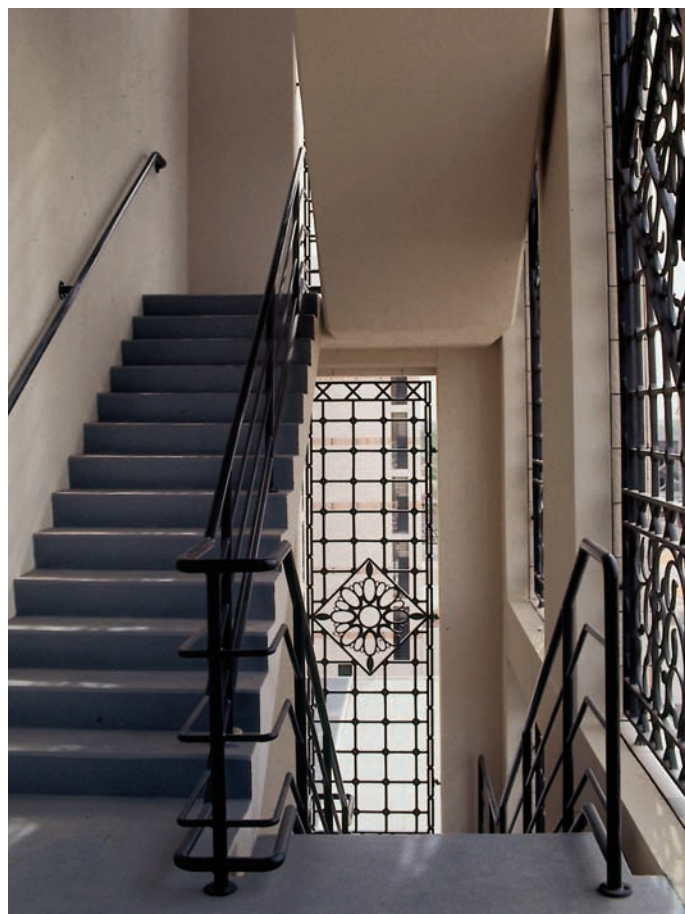
Top right

Faculty of Medicine, al 'Ayn University

Bottom right

View from the library overlooking the courtyard and dome of the mosque, Faculty of Medicine, al 'Ayn University





Above left
The mosque seen from the mihrāb, encased in blue ceramic tiles, Faculty of Medicine, al 'Ayn University

Above right and left
Detail showing the cast-iron grilles used to cover the openings throughout the building, looking over to the Faculty buildings and courtyard of the main block

Liwā Oasis

Situated north of the Empty Quarter, Liwā is the original dwelling of the desert Arabs of this region, and the stronghold of the Banī Yās tribe (one of the largest and most influential tribes of the Emirates), who settled there in the seventeenth century. Liwā's urbanization has transformed the original nomadic community of the oasis into settlers, and engaged them in farming activities (providing a surplus of produce that is subsidized by the Government and redistributed). The housing projects that contributed to this process are known as 'popular' (*sha'biyyah*), although they are actually villa-type housing of a high standard. This housing is found in several locations, forming streets of typical villas with high retaining walls enclosing front courtyards. The remaining unpaved sandy streets connect these housing sites, now inhabited by Arabs (the *Bedu*), to their previous abode in the sands. Some magnificent expanses of sand still exist in al Baṭnah desert, with cultivation encroaching in areas that have been levelled and drip irrigated for the purpose of planting vegetables. The oasis is quite lush, and main city streets are lined with trees and flowers in the middle and on either side of the carriageway. The previous Bedouin settlements in the sands consisted of 'arīsh-type structures, which have been kept to house the camels and sheep, and more recent corrugated and tin-panelled housing, currently used for storage by the original owners who are now settled in the housing projects. Both the socio-economic and environmental transformations that have taken place are remarkable ones considering the brief time span in which these changes have occurred. It was only relatively recently that the *Bedu* moved to their new housing schemes. The function of the tent as the sole form of shelter has been abandoned, and the tent now exists as a complementary extension to the new concrete housing, where this traditional lightweight structure is set up in the forecourts adjacent to or outside the walled villas, and used for traditional entertainment and living and for keeping tame falcons.



Above
Exterior and interior views of a traditional inhabited tent, in Liwā, located close to the popular housing area



Līwā Oasis has 15 forts in total, only three of which were visited, including Qal'at Ḥuṣn al Zufayr and Ḥuṣn al Qatūf.

On our visit to Līwā in 1996 we met with Sālim Ḥamdān al Manṣūrī, who accompanied us. He explained that he lived in Ṣaḥrā' al Qarmadah, the Qarmadah



Top left

The 'arīsh type of dwelling used for shelter at a camel farm in the Līwā desert. No longer used as housing, these dwellings serve as resting houses and accommodation for the keepers and camel guardians

Left

One of Līwā's renovated forts, Ḥuṣn al Qatūf with Sālim Ḥamdān al Manṣūrī in the foreground

Above

Entrance to Ḥuṣn al Qatūf, Līwā

desert, up until 1992 when the whole tribe moved to the new housing built for them. All the Arabs have left the desert and live in the *sha'biyyah* now. The street they live on is called after the name of the desert they dwelt in, al Sha'biyyah al Qarmadah. Each of their villas has three rooms, and a *majlis*. In the forecourt the majority have constructed tents, where they keep their precious falcons. The tent, he added, provided warmth during the cold evenings since they could light fires inside: 'People who come from afar tell us we shouldn't light a fire inside the houses; however, we have to light a fire so we do outside in the tent, not only in order to keep warm but also to create light in the tent, and to recall the early days.'

**Above**

One of the villas in the al Sha'biyyah al Qarmadah area in Liwā. Tents are constructed by the inhabitants immediately outside the premises on the unpaved street

Right

The tent and a detail of the structure built outside Sālim al Manṣūrī's villa in Ṣaḥrā' al Qarmadah at Liwā. The falcons are kept in the tent. Sālim sits with his son to his left and boys from the neighbourhood to his right



Their previous tents were actually made out of 'arīsh, palm fronds which had extensions of corrugated iron sheds for the animals. They have kept these in the desert, where they attend to their camels and livestock (sheep and hens).

When asked if they were comfortable in the new houses, his response echoed all the *Bedu* of the area we had met, who had a genuine affection for Shaykh Zayed, and referred to him by his first name: 'We are, thanks to Allah, comfortable just with food and water. In the past we had a harsh desert existence in the interior. And he [Zayed], by Allah, has spared nothing and no one, the houses abound, the farms abound and money abounds.' We were invited to have coffee with Sālim and his tribe, and went to his house where we were received in the tent. Coffee and the tray of fruits were served, however, on the sand outside the villa wall, effectively out on the street.





Above

A villa on the edge of the desert in the urbanized part of Līwā, where it is still a tradition to have coffee and fruit outside the premises, sitting on the sand

Left

A street showing the low-cost villa housing in al Qarmadah at Līwā. The road then extends freely to join the desert sands

Bottom left

Some tents are put up inside the villa compound, opening to the house garden and front yard



Review of projects

Abu Dhabi

Armed Forces Officers' Club and Conference Centre

Roger Taillibert (Paris, 1997)

HH Shaykh Zayed Bin Sultan Al Nahyan identified the need for such a complex in order to provide comfortable, and what became outstanding, facilities for members of the armed forces. Subsequently, a competition was held under the auspices of HH Crown Prince of Abu Dhabi Shaykh Khalifah Bin Zayed Al Nahyan (Deputy Supreme Commander of the UAE Armed Forces), and supervised by HH Lieutenant Colonel Staff Pilot Shaykh Muḥammad Bin Zayed Al Nahyan.

Roger Taillibert's project was selected and the design process was completed during the course of

1985–6. Construction of the main Club building commenced in 1987. Ten years later the Club and accommodation buildings complex were complete. A project summary was submitted to the Aga Khan Award for Islamic Architecture 1995 cycle.

Covering 75 hectares of reclaimed land, the site occupies the south-east corner of Abu Dhabi Island. It is located 12 kilometres from the city centre and 15 kilometres from Abu Dhabi's international airport. The Arabian Gulf creates favourable south and south-east borders for the site, while to the north the main causeway links to al Muṣaffaḥ Bridge, running east of the

Below

Aerial view of the Armed Forces Officers' Club and Conference Centre in Abu Dhabi. The shell structure, set against the Arabian Gulf, shows the north-facing entrance in the foreground and the accommodation wings to the south surrounding the garden



island joining the main route south towards al 'Ayn and Dubai. Apart from being an appropriately secluded location that belonged to the Ministry of Defence, the choice of site was also determined by its proximity to the army's general headquarters.

Seldom does a site for a project prove so perfectly abstract and flat, unhindered visually or physically by any urban development. Bordered on the north and west by the quiet vastness of the desert, it also has the shore of the Gulf winding round its southern and eastern perimeters.

Despite the impressively high-tech appearance of the structure, the master plan and design scheme entertained the form, and function, encountered in the architectural environment of the Arab desert and towns. This attempt remains within the confines of modern architectural expression, and unfortunately the sophisticated concepts or nuances inherent within the historic urban or temporary settlements have not been addressed. The relationship between the exterior and interior and the quality of movement within the enclosure of the building's spaces has been compared by the architects to the movement of the Bedouin crossing the sands to the oasis. It became one of the guiding design concepts that the master plan and floor layout should resemble a tent in structure.

The architect highlights the 'poetics' inherent in Islam, the Arabs and the desert.²⁹ The dramatic landscape and cultural history have tempted every orientalist to flirt with the power and fascination of the terrain, nature and people of Arabia. But here it is strong light that is celebrated instead; the same light that Arabs have intentionally obscured and skilfully diffused in the planning of city streets and interiors of buildings. The ideas of landscape and architecture are organically merged where they have traditionally been separated, and the walls provide an enclosure to a refined constructed exterior, in contrast to the Islamic concept of architecture which separates the space of the designed interior from the exterior. Despite the romantic orientalist rhetoric, the use of geodesic and lightweight structures is part of a lineage of modernist Western tensile-structure design, as advocated by Buckminster

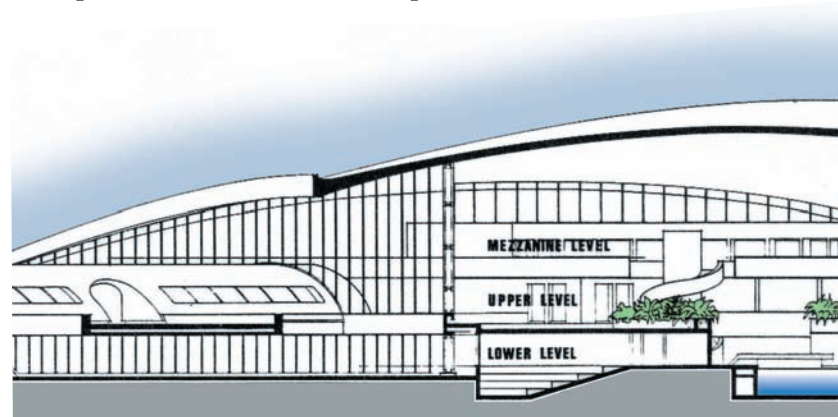
Fuller and Frei Otto, Skidmore, Owen and Merrill (SOM) and more recently the works of Hopkins, Piano and FTL.

Considering the circumstances, it is beyond dispute that the site is a dream to any architect. Ultimately, however, the challenge was in designing and constructing a state-of-the-art building that lay upon the sands as opposed to producing a structure that could challenge the sands.

The main Club building is roofed with three wide-span, prestressed-concrete shells, resting on an external abutment, covering a total area of 23,500 square metres, without any intermediate support. Each of the two triangular lateral shells covers an area of 9,000 square metres, with a span of 150 metres. The thickness of the shell membrane is between 20 and 35 centimetres, increasing to a metre at the abutments. The weight of the shells is approximately 9,000 tonnes. The central shell, which covers an area of 5,500 square metres, has a trapezoidal shape.

The technical challenge faced by the architects was to create, in their own words, a 'modern tent' of some 25,000 square metres – without any visible support – thus creating a contemporary monument.

The extensive project suggested an all-encompassing, trifold-vault design. Inspired by the concept of the tent as a lightweight structure of the desert, the architect intended the design to form a link between centuries of traditional life in the vast desert of the Arabian peninsula and the expectations of modern urban society. The experience of wide-span structural techniques (similar to those used by the architect in designing the Olympic Complex in Montreal) made it possible to achieve the





Far left

Interior view showing the interplay of levels in the design of the circulation of linking staircases in the foreground and free-standing lift shafts in the background against the skylight of the central spherical vault

Left

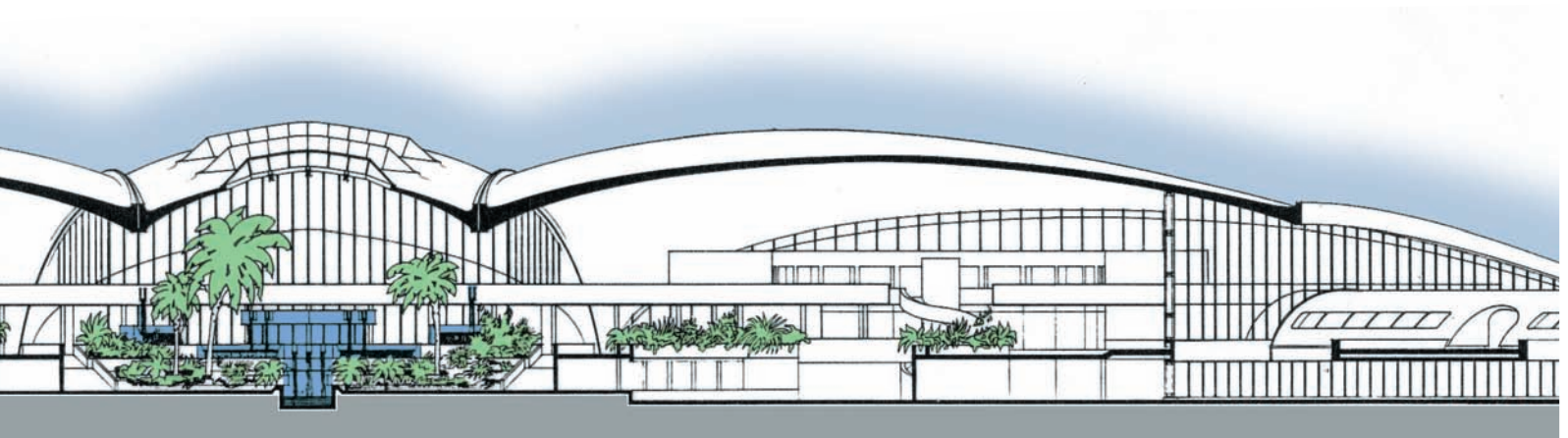
Interior garden of the western accommodation wing

Above

Close-up of the structural shell showing the central and west vaults of the Club complex

Below

Section through the vaulted shells encompassing the Club complex showing the main north entrance and different levels with the connecting galleries to the east and west accommodation wings



large spanning 'tent' structure. Covering 25,000 square metres, it is supported at six points around the perimeter, each bearing around 10,000 tonnes of vertical force. Three shells make up the roof, two triangular and one elliptical, with a total span of 265 metres. The structure is made of steel, concrete and glass.

A double causeway, separated by flower beds and fountains on either side of it, leads to the main Club house building which comprises one axial and two lateral wide-span, prestressed-concrete shells.

The accommodation under the shells is organized on five levels: the basement contains technical and service spaces which include sub-stations, air treatment plant rooms and kitchens; level one, the ground floor, provides sports facilities and gardens; level two, the first floor, is for administration and management, business and cultural activities, and includes a restaurant and leisure facilities; level three is for VIPs; and on level four is the circulation gallery.

The accommodation is divided between the eastern and western wings, which are symmetrical in plan, wrapping around the garden space of the inner plaza. It is connected by an inner walkway on each of its four levels. The two passages follow the garden space of the inner plaza, thus avoiding the necessity for anyone to go outside in the heat, while ensuring the privacy of the two wings. Separate entrances link the main club building and facilities through vaulted galleries, like pedestrian streets, to the two curvilinear buildings each accommodating 350 units of varying types.³⁰



Above

Southern Club entrance at ground level showing the steel and glass curtain wall joining the structural shell with the skylight slits. The area encloses fountains and gardens, and the steel-clad mushroom-shaped structures serve as air-conditioning ducts throughout the building

Below

North-facing elevation of the Club's main entrance with driveway approach





Above
Segment of the shell and glass wall joining the structural shell with the skylight above



Top
One of the round sliding doors (opaque glass panels and steel frame) showing the marble cladding of the walls of the VIP western lounge



Above
Seating on the terrace of the third floor beneath the skylight of the central vault with two air-conditioning steel-clad mushroom-shaped structures on either side

Baynunah Tower

Arkan Architects and Consultants (Abu Dhabi, 1995)

The various functional components of the Baynunah Tower have been incorporated into a cluster of three towers all encapsulated by a deep blue tinted reflective-glass curtain wall. Towering high above the Abu Dhabi skyline, the towers are complemented by ornamental clad white cylindrical shafts on the façade. Interiors have been elaborately designed in a modern Arabesque style, utilizing quality materials and finishes.

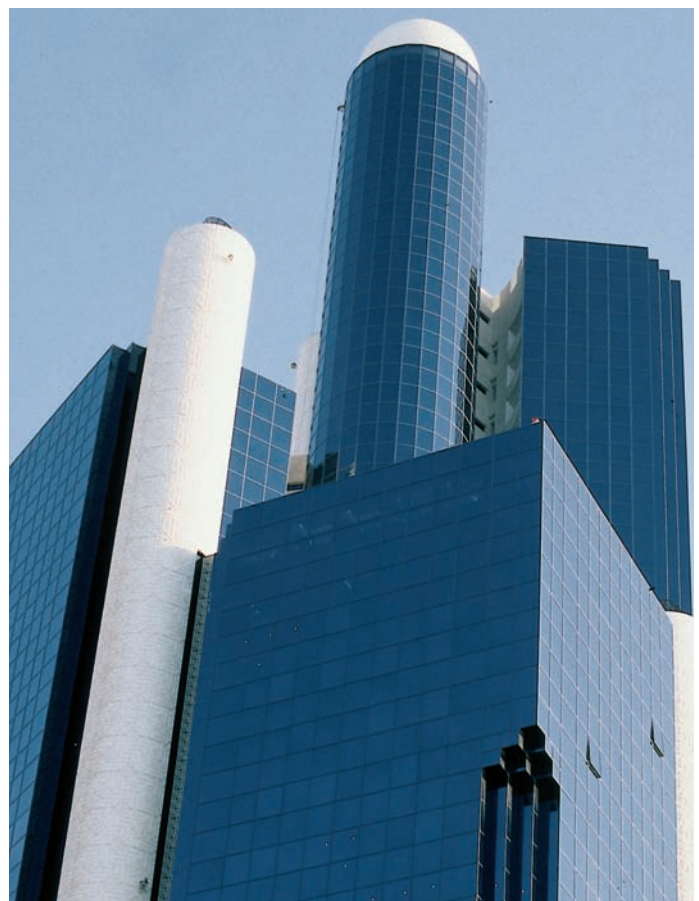
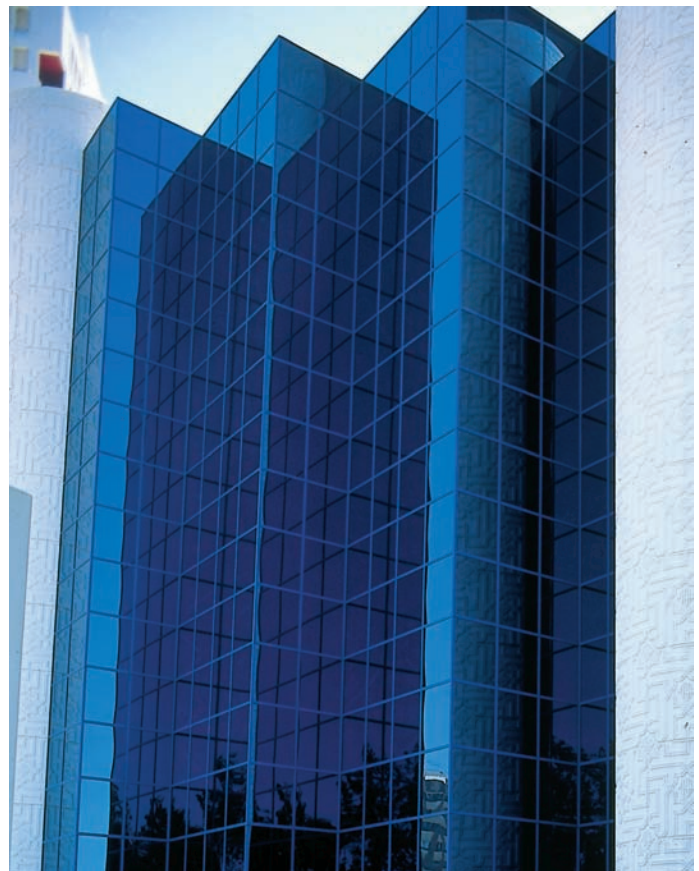
According to the architects, 'contemporary architectural thought, attention to detail and the quality of workmanship epitomizes the Baynunah Tower, creating the focal point of a high level of achievement and confidence in the progress of the UAE and the capital city of Abu Dhabi.' The three principal blocks rise to heights of 24, 30 and 36 storeys above ground-floor level. They cluster round a central cylinder shaft which extends to a height of 160 metres.

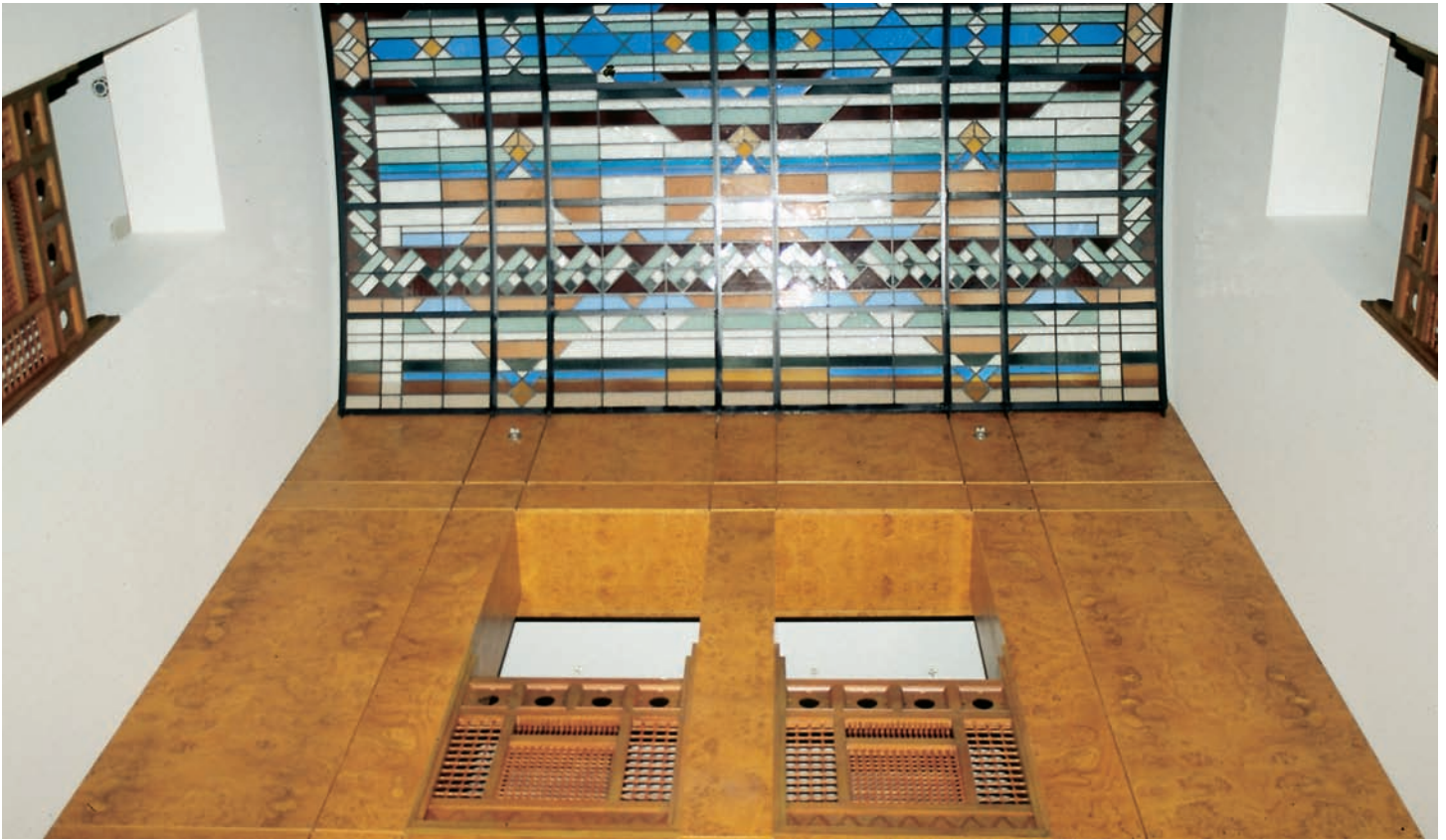
The residential apartment entrance hall, located on the ground level, features 24-hour security and a large reception area in an elegantly designed interior. The accommodation provided in the Baynunah Residential Apartments is luxurious. Located on levels 11 to 35, the apartments are designed to high international standards to provide maximum efficiency per square metre of floorspace. Annexed to the main body of the Baynunah Tower is a five-storey block which houses the hotel reception, general facilities and catering services.

Stained glass casts sunlight in different colours onto the polished marble tiles which fan out in geometric patterns throughout the high-ceilinged entrance hall and into the reception lounge, the lifts lobby and the five high-speed lifts to all 35 floors. Two glass lifts with panoramic views transport hotel guests to four levels of suites, the spaces of which impart a preview of the pristine urban surrounds.

Right

The Baynunah Tower and external details of the building showing the cylindrical towers clad in white geometric tile panels, with a repeat pattern based on the eight-pointed star. A brass grille in the same pattern provides filtered lighting. The entire building façade is encased in deep blue reflective glass. A subtle interpretation of the Islamic squinch forms an interesting movement, breaking the surface of the corner edge





Control rooms on either side of the hall monitor the utilities of Baynunah Tower, including centrally controlled lighting, air-conditioning, power supply, fire protection, satellite communication system, CCTV security system and a building management system.

Leisure facilities are located on level 29, including a large L-shaped swimming pool, health club and coffee shop, all with a panoramic view of the city.

The total built area is 45,000 square metres, the total cost 38 million pounds sterling.

Top

Detail of the stained-glass tiles in the vaulted ceiling of the entrance area. The openings in the wooden panelled wall are of the café at the mezzanine level

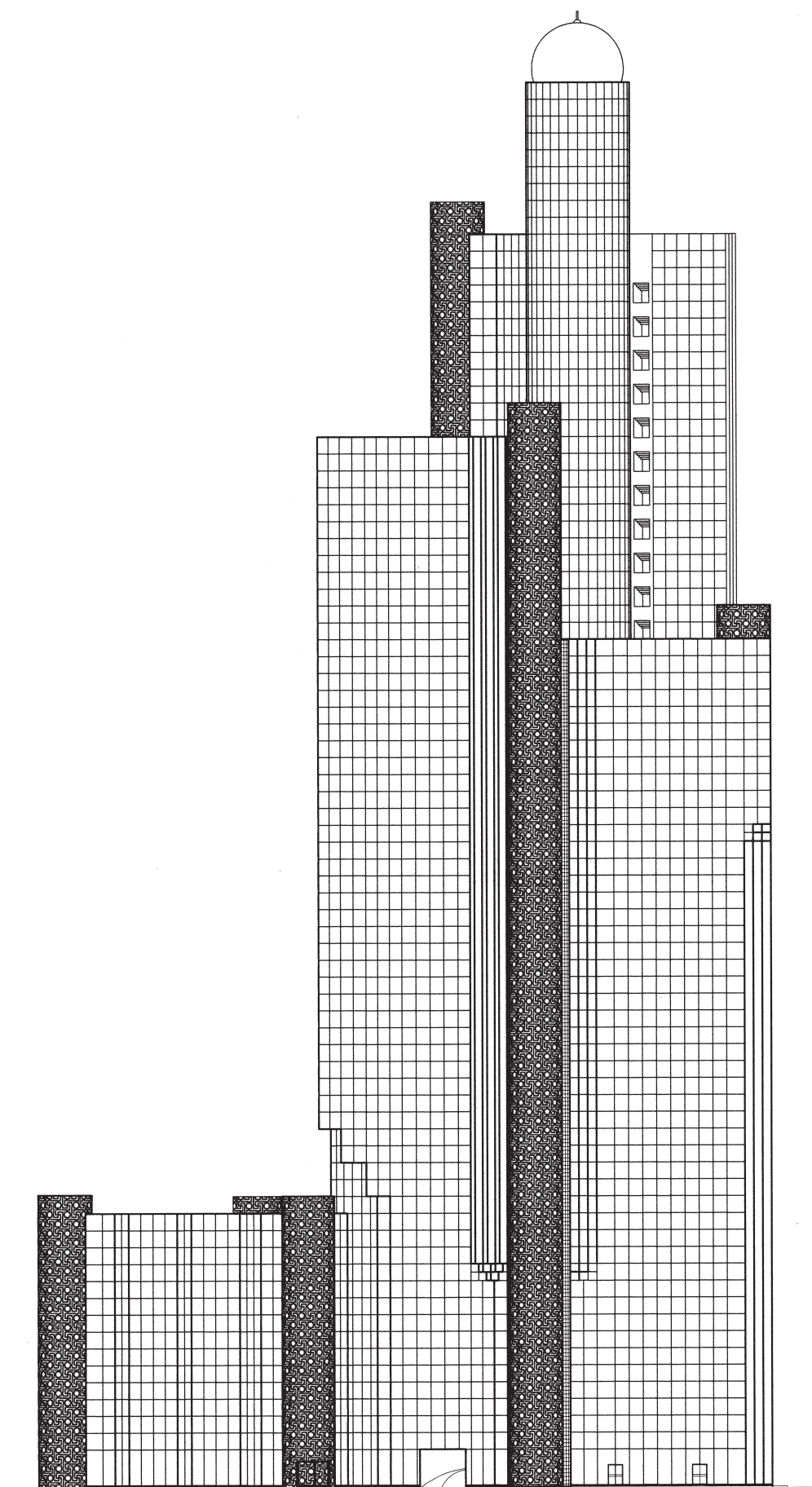
Above left

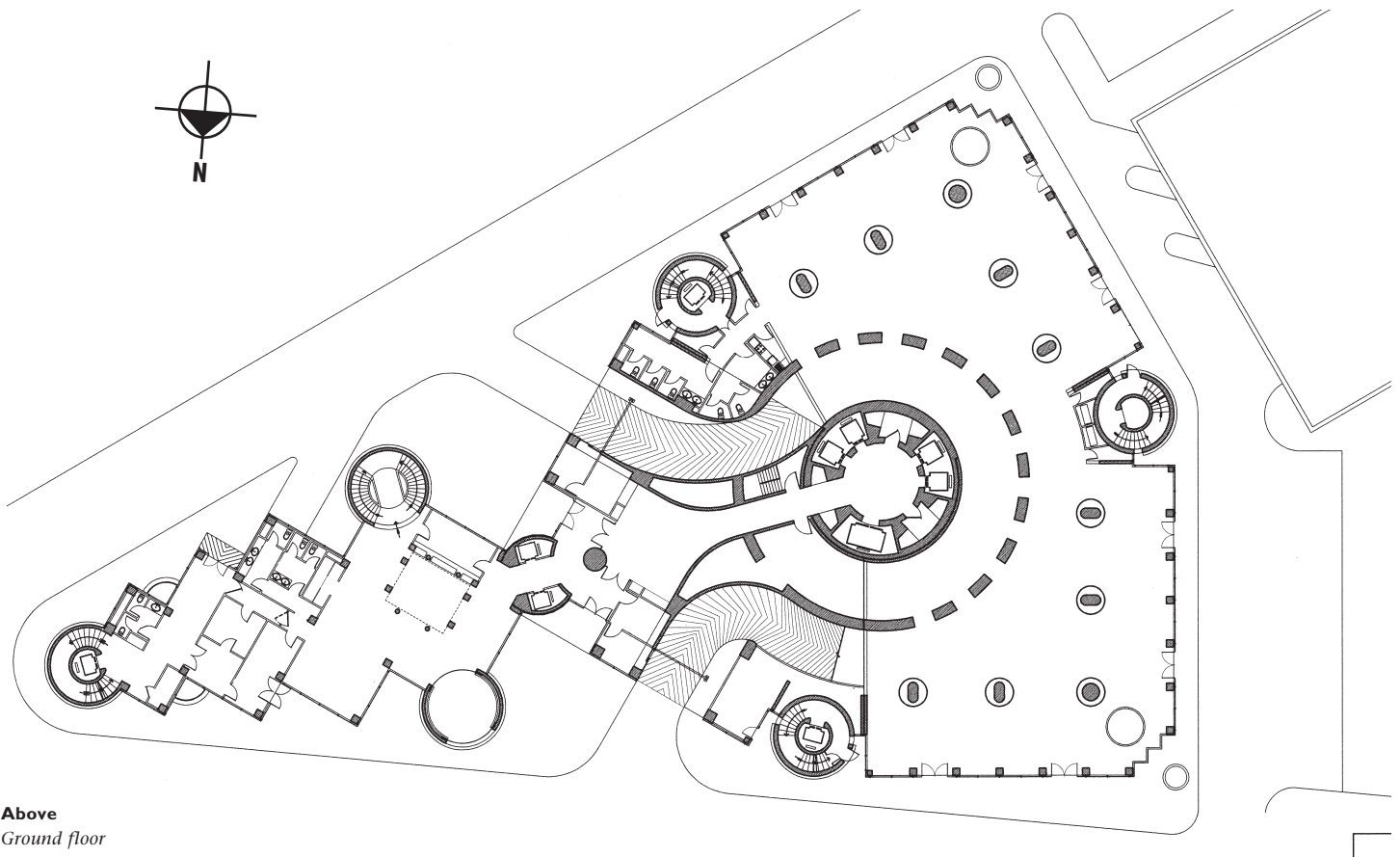
View of the marble-clad corridor leading to the residential apartments on the twelfth floor. The lifts on either side have mirror-panelled doors

Left

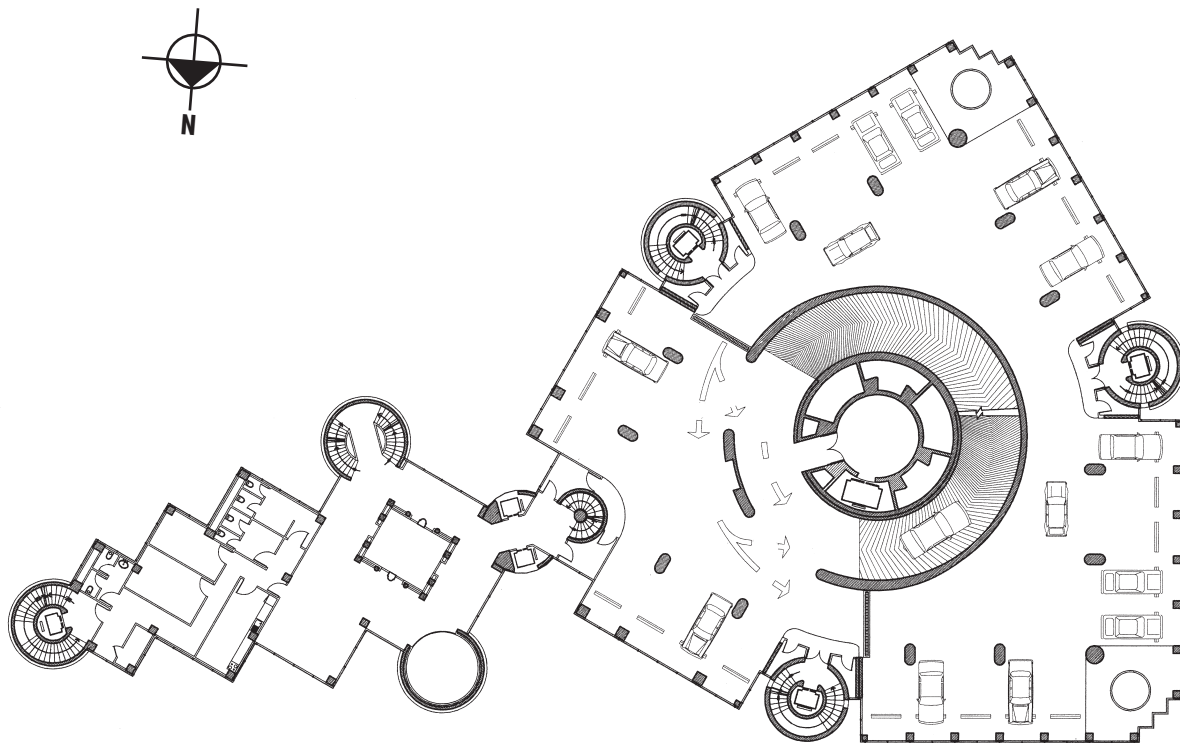
Entrance foyer, showing the marble floor and mashrabiyyah screens of the first floor café and lounge

Baynunah Tower
North elevation



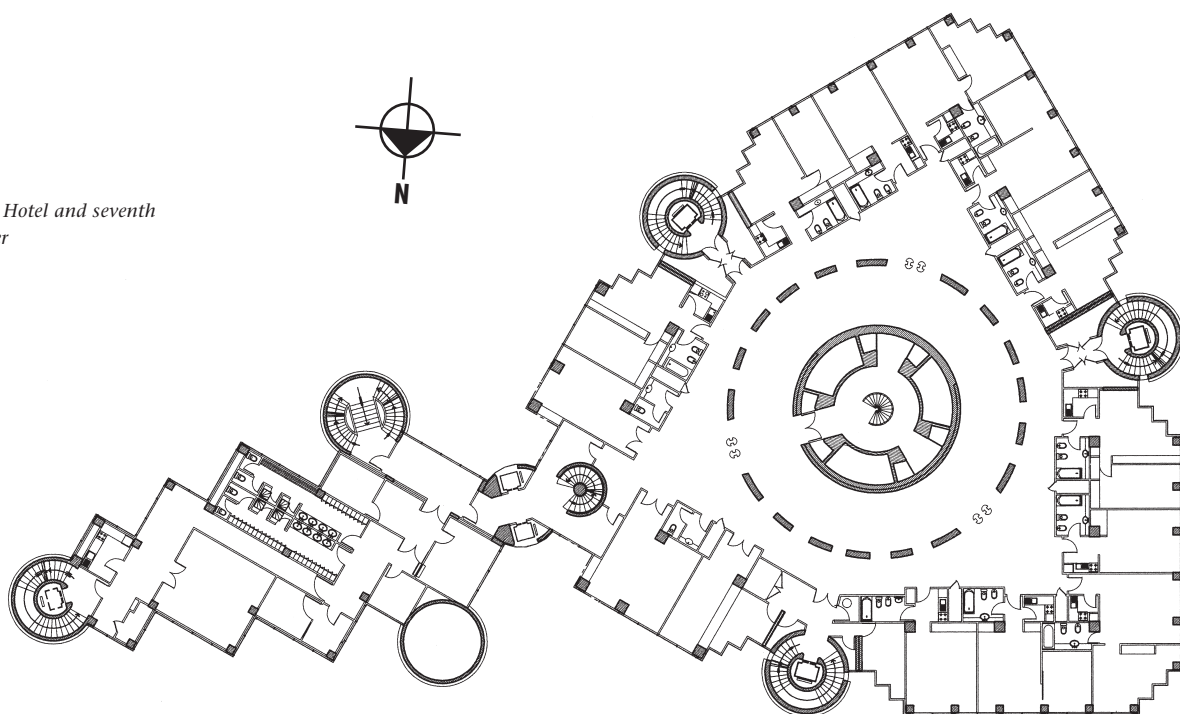


Above
Ground floor

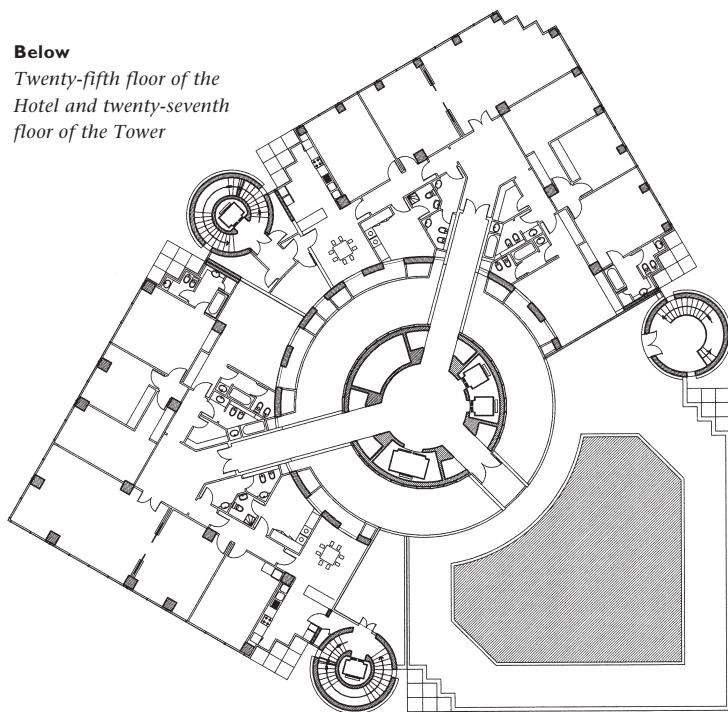


Above
First floor

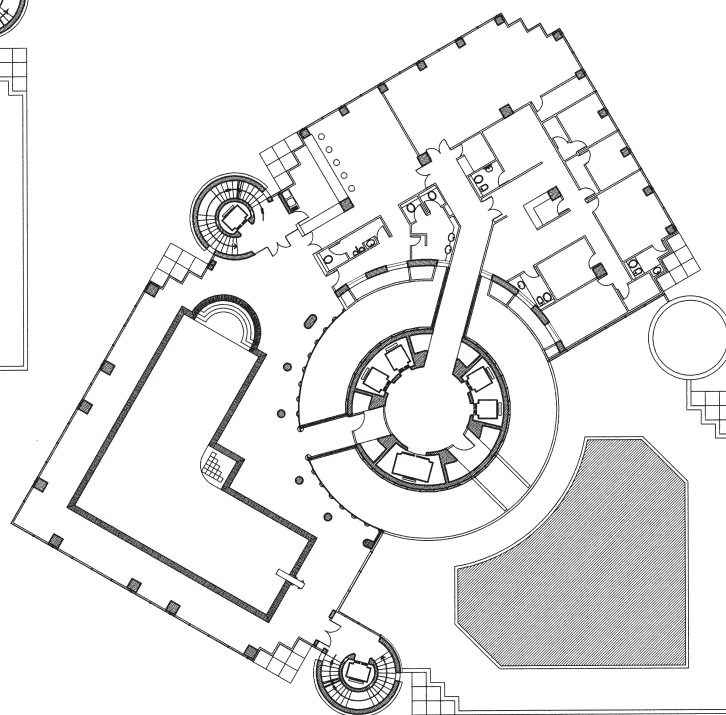
Right
Fifth floor of the Hotel and seventh
floor of the Tower



Below
Twenty-fifth floor of the
Hotel and twenty-seventh
floor of the Tower



Above
Twenty-ninth floor of the Tower



Ministry of Finance and Industry

Jafar Tukan Partners (Jordan, 1983)

The Ministry was designed in 1976 by Jafar Tukan Partners who have carried out several projects, including private residential, commercial, educational, mosques and Government buildings, in Dubai and Abu Dhabi.

The modest and formal lines of the Ministry of Finance and Industry distinguish the building as a sober but attractive structure amidst the urban variety of exuberant expression. The building is composed of two adjoining L-shaped blocks; the larger eleven-storey block houses staff offices and the smaller six-storey block accommodates formal activities and is built around an atrium of variable cross sections which is open to all the floors.³¹



Right and below
Main façade and back elevation

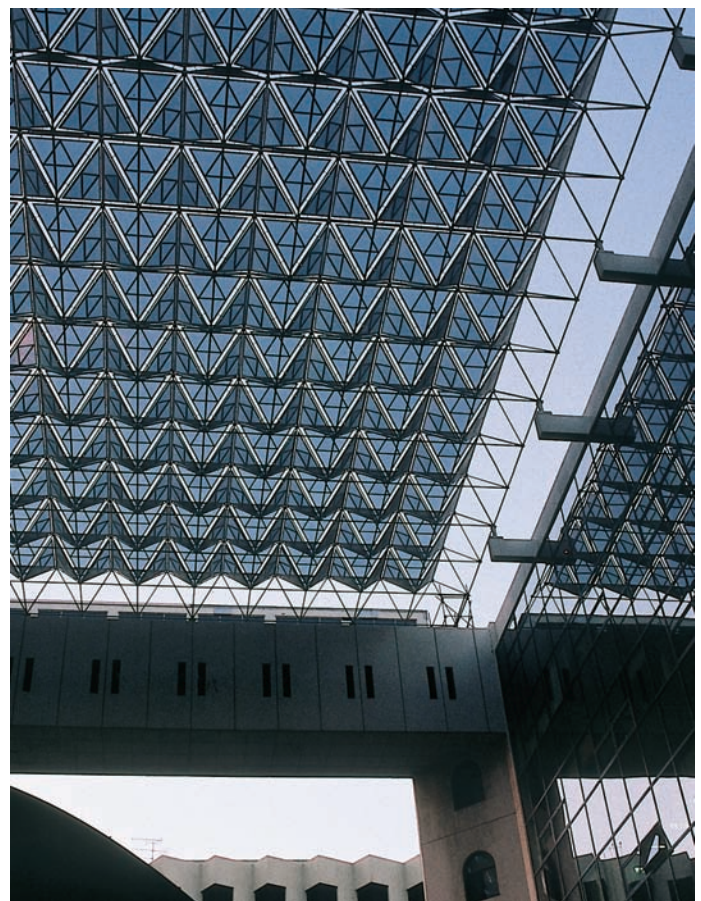


Dubai City Hall Complex

*Pacific Consultants International and Civic Design Studio
(Tokyo, 1979)*

An international competition was held by Dubai Municipality in 1974 for the design of the municipal complex. Pacific Consultants International's scheme was selected and the design development was contracted to Civic Design Studio. The construction commenced in 1976 with the total cost of 12 million US dollars and covers a total floor area of 18,625 square metres on a site of 12,500 square metres.³²

The design concept was, according to the architects, evolved around uniting the functions of the council chamber, city hall and administrative office. This was accomplished in two blocks. The first is a seven-storey L-shaped building housing the Administrative Offices with the seventh floor extending horizontally in the air and squaring the mass. The extensions from each wing, termed 'flying corridors', are supported by free-standing pillars to the height of the six floors. This mass was rendered in fair-faced concrete with epoxy paint finish and aluminium curtain walls. The interior façades of the office wings open onto a court and pool, reminiscent, to the architects, of an oasis. The second mass is contained within the parameters of the square and is composed from a quarter-sphere housing the City Hall and the Council Chamber that forms a 'curvilinear volume' extending towards the waterfront and above the pool with supporting columns. The Council Chamber is a reinforced-concrete shell with polished Brazilian granite cladding. The flying corridors were erected in steel truss, and a warren-truss space frame spans the roof canopy above the courtyard. The project was submitted to the Aga Khan Award for Islamic Architecture 1986 cycle.



Top right

View of the quarter-sphere housing the City Hall in the shaded foreground, with the flying corridor extending above

Bottom right

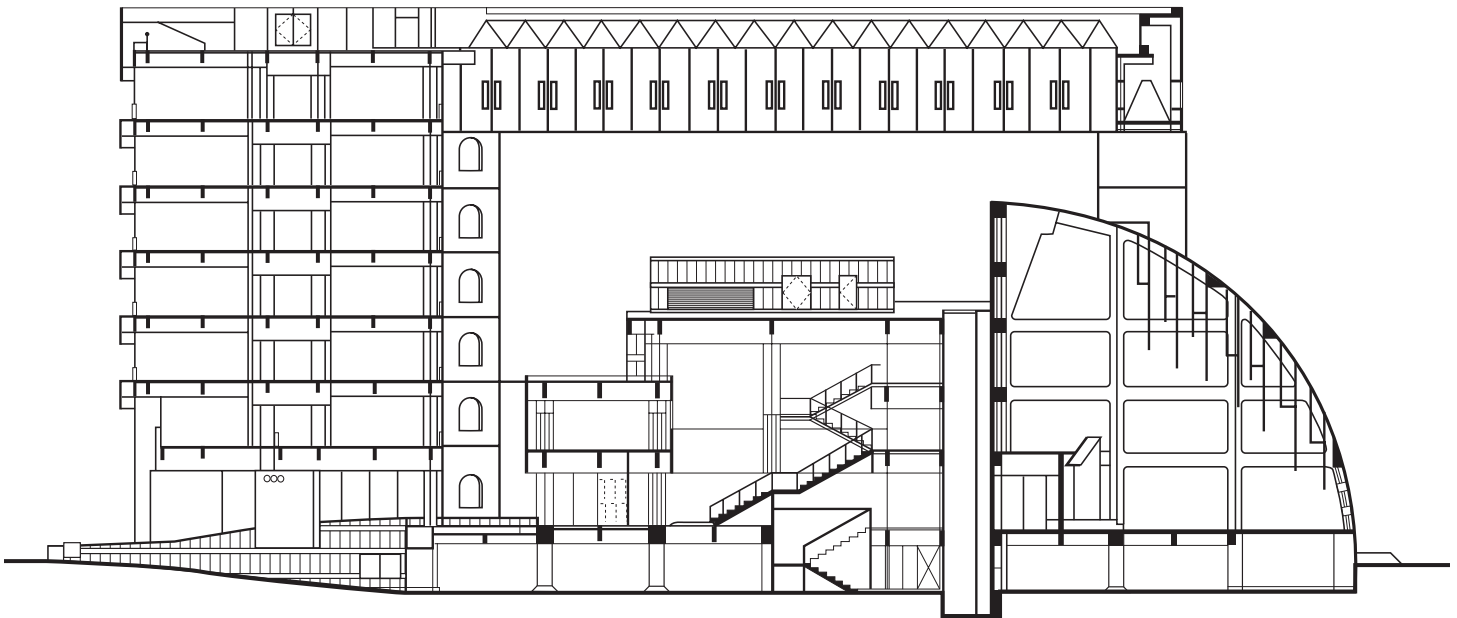
Detail of the warren-truss space frame spanning the roof canopy above the courtyard

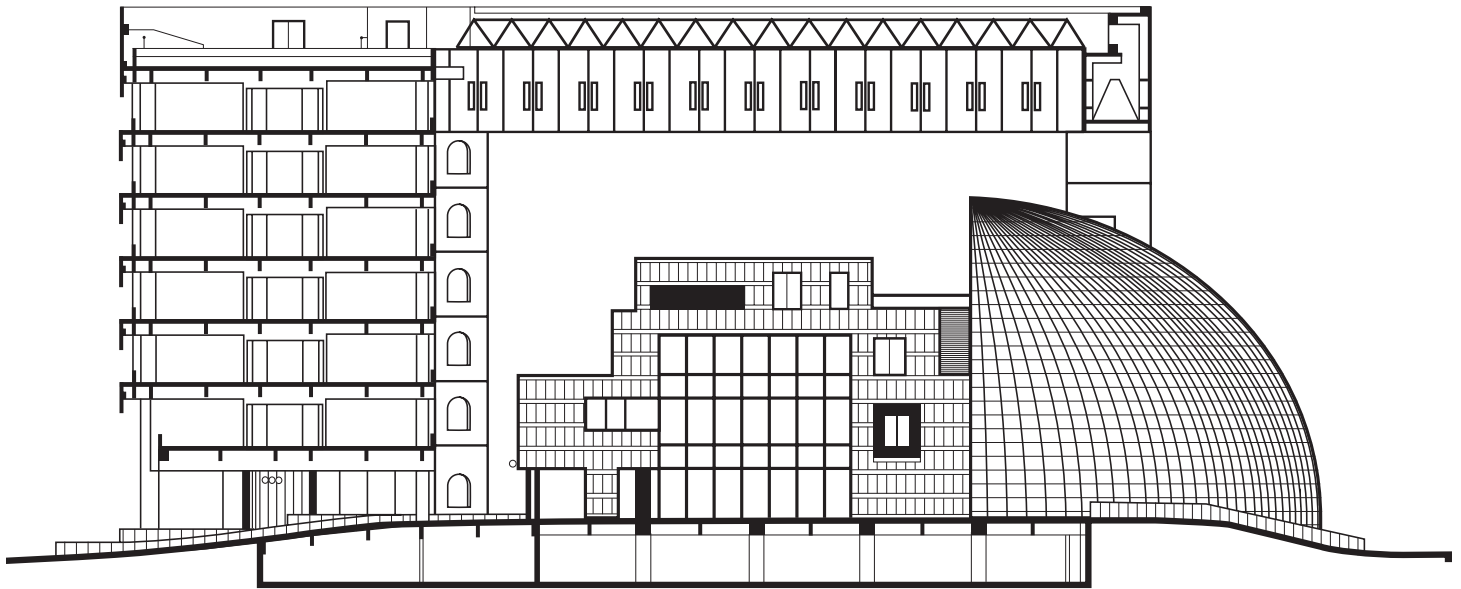
**Left**

Part of the Council Chamber in the complex that forms a 'curvilinear volume' extending towards the waterfront and above the pool with supporting columns

Below

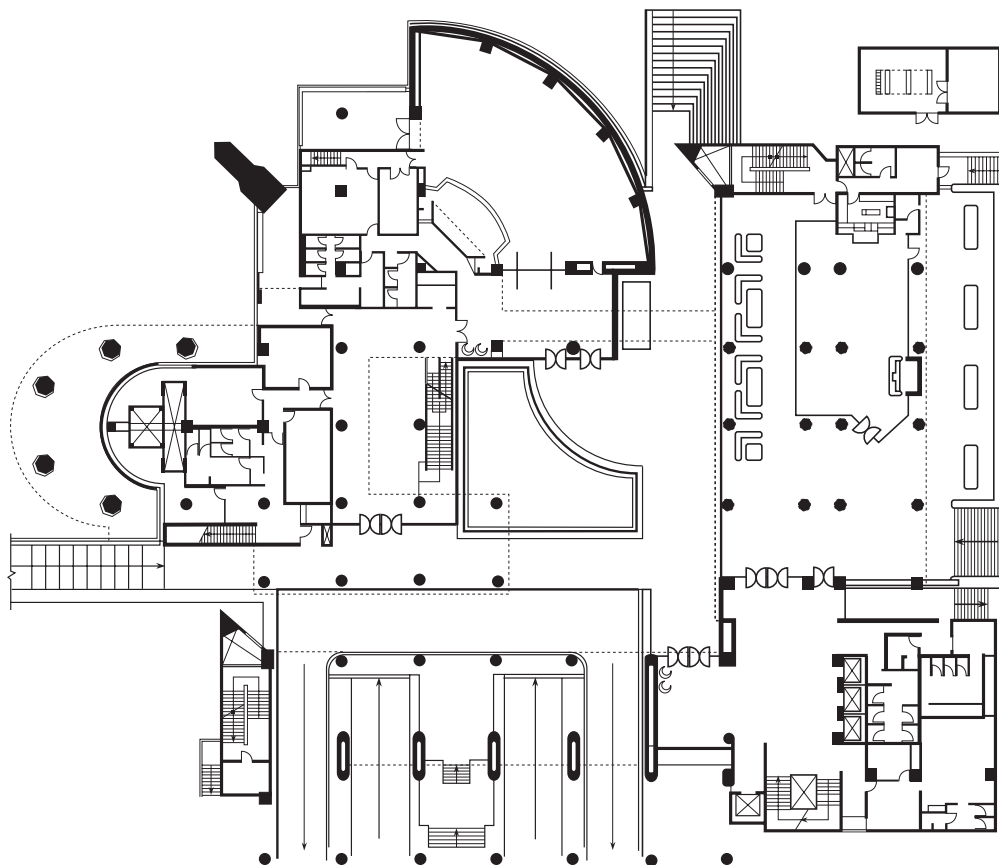
Longitudinal section

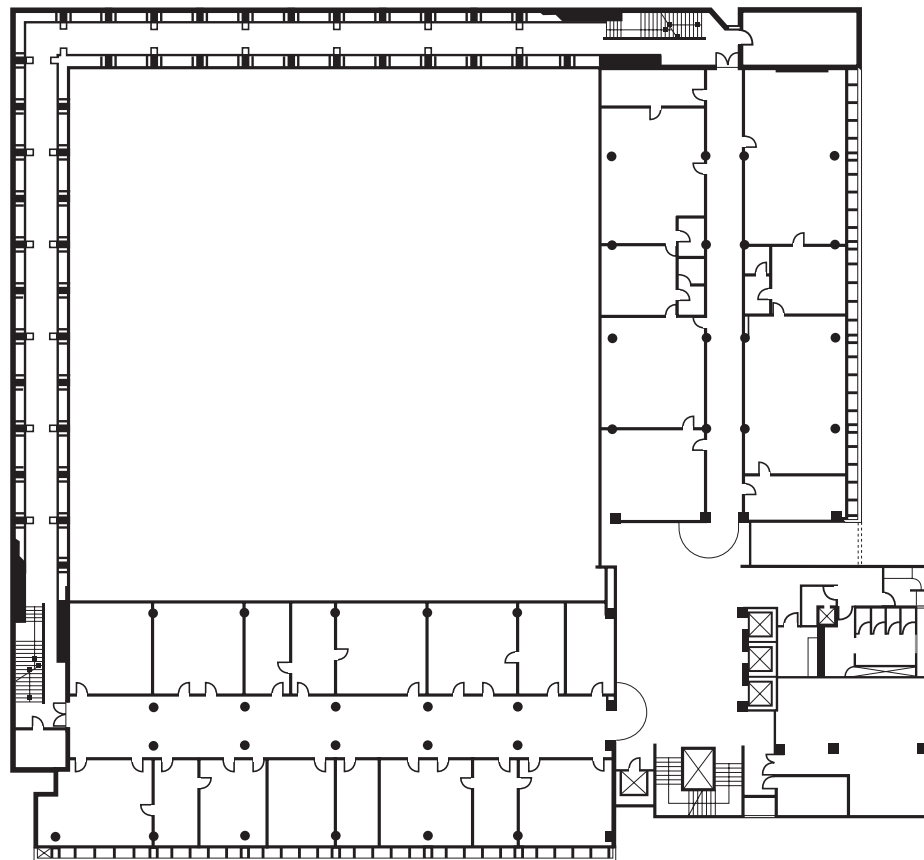
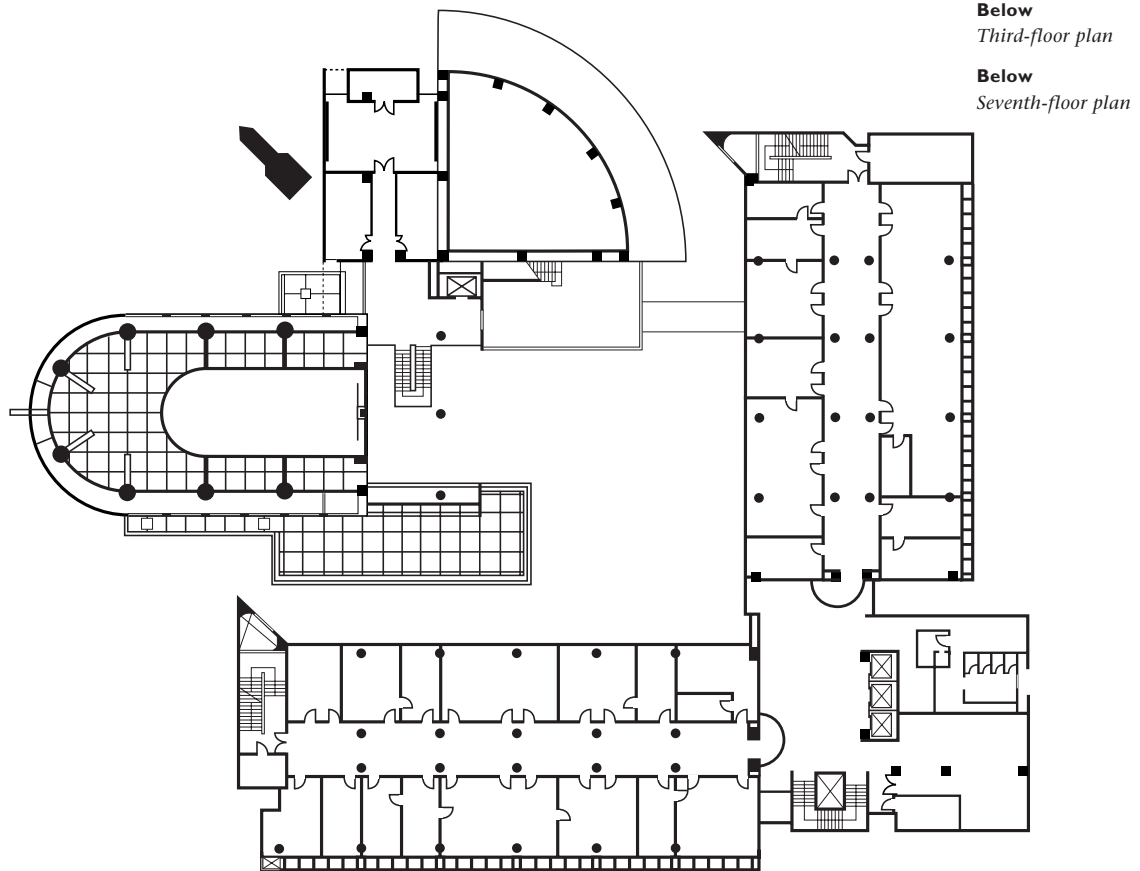




Above
North-south section

Below
First-floor plan

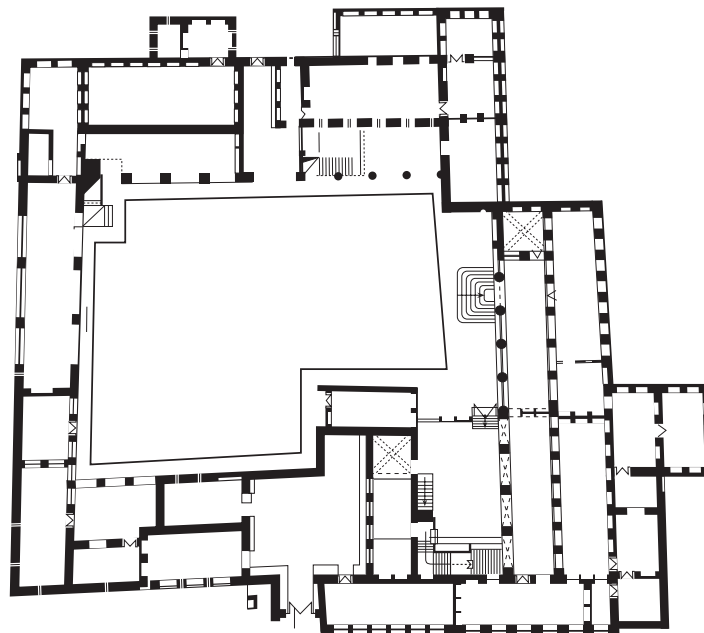




Restoration of Shaykh Sa'īd House

Makiya Associates (Dubai, 1986)

In 1980 this abandoned building was surveyed and its reconstruction approved by the Āl Maktūm family. Situated in the Shandaghah district on the bank of the creek, the building occupies a site of 3,050 square metres and a total built floor area of 1,975 square metres. The total cost of the project was just under two million US dollars. The building was completed in 1986. The house is built on two floors around a central courtyard with two entrances. The majority of rooms open onto the central courtyard and are shaded by verandas. The outer façades are punctuated by blind arches, forming niches and recesses as well as small openings for ventilation. Four windtowers contributed to the original ventilation of the house. According to the architects, 'the restoration works included the salvaging of reinforced concrete raft foundations, floors and structural frame, from the coral-stone walls. Walls are rendered externally and internally with a hand-applied soft *fārūsh* plaster, made of local sand, lime and cement.' The project was submitted to the Aga Khan Award for Islamic Architecture 1995 cycle.³³



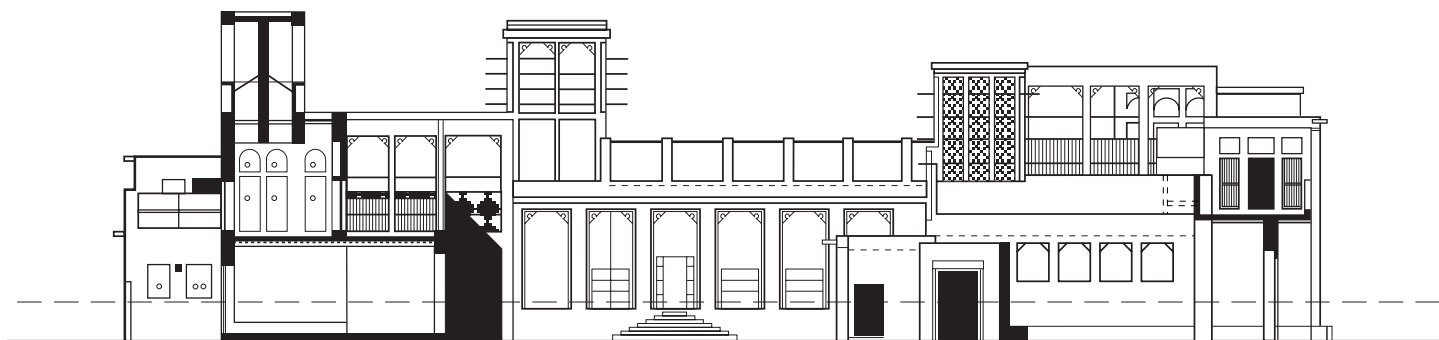
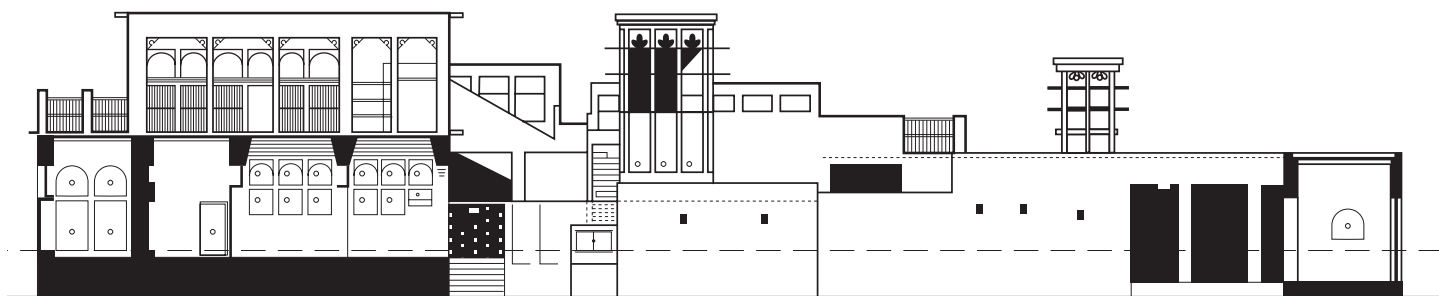
Above

Site plan

Below

Ground floor plan sections C–C

Ground floor plan sections H–H



Diwān of the Emir

John R. Harris Architects (London, 1990)

John R. Harris Architects were commissioned to design the Diwān of HH The Ruler of Dubai in 1984. The construction commenced in 1987 and the building was occupied in 1990. The site covered 117,300 square metres of which the ground floor covers 6,175 square metres. The total cost of the project was over 34 million US dollars.

Clearly evoking the traditional style of domestic architecture in Dubai, and particularly reminiscent of the adjacent windtower housing of the al Bastakiyyah quarter, ‘the building was designed to be in sympathy with the history of the area and to open a new Government Square to the creek and the old renovated Fahīdī Fort, now a museum.’ The Diwān is a low-rise building, with an impressively elegant low profile, in contrast to the forceful high-rise development that clutters the city. It was designed around two landscaped courtyards housing the main *majlis* of the Ruler with the traditional windtowers incorporated within the space, VIP suites overlooking the creek and conference facilities for summit-type meetings. The project was submitted to the Aga Khan Award for Islamic Architecture 1995 cycle.³⁴

The practice of John R. Harris Architects has maintained an office in Dubai since 1958. It was involved in some of the earliest projects that included: the Survey and Development Plan Abu Dhabi in 1961; first Town Plan for the City of Dubai 1958 and the Review of the Development Plan in 1971; Āl Maktūm Hospital in 1958 and the Dubai Hospital in 1982; and the Itiḥād School, Dubai. Commercial projects include The Dubai Hilton Hotel, Dubai Metropolitan Hotel, National Bank of Dubai (1979), Abra Point, National Bank of Dubai HQ, the British Bank of the Middle East (1993) and the Dubai Trade Centre Tower. The last was constructed in 1975 with 39 storeys, and was described by A. E. J. Morris as ‘becoming then the tallest building in the Arab World’. He explains that ‘the first design had a pronounced horizontal emphasis which was converted, at the request of the client, the Ruler HH Shaykh Rāshid bin Sa‘īd Āl Maktūm, into the vertical form of



Top

View across the creek in Dubai showing the Bur (barr) Dubai district in the background with the Diwān of the Emir, bordered by windtowers. In the foreground is the district of Dayrah and the earlier urban development of the 1970s

Above

Aerial view of Dubai's winding creek and the high modern commercial buildings at the end of the Dayrah's creek shores

the Arabian Gulf's first true skyscraper'.³⁵ The qualities of being a true skyscraper and the tallest building have long since been in demise.

National Bank of Dubai, Headquarters Building

NORR Group Consultants International Ltd (Toronto and Dubai, 1998); Design Architect: Carlos A. Ott

Established in the Emirates since 1990, the NORR Group has been responsible for several institutional and commercial projects in Dubai and Abu Dhabi. Most noted among those in the capital Abu Dhabi are the Forte Grand Hotel (1993), recently renamed as the Abu Dhabi Grand; the Union National Bank (1995); the Abu Dhabi Company for Onshore Oil Operations Headquarters (ADCO) (1998); and the Al-Muhairy Centre, with its office, residential and retail components (1998). In Dubai, however, two recently accomplished works stand out as being in an architectural league of their own. These are the headquarters of the National Bank of Dubai (design architect Carlos A. Ott), completed in 1998, and the Emirates Towers.

NORR Group's Dubai projects set the tone for serious architectural work, successfully merging high-quality design, materials and engineering technology in a predominantly minimalist and understated design. This is carried through in the execution of the elegant structures and façades and in the consistently creative interplay between volume spaces. The use of building materials is faithfully mastered on the exteriors and interiors, paying tribute to a spartan monument of modern architecture, and masterful competence despite overall challenges and conceptualization is evident in the building finishes of the high-modern structures. NORR Group's projects represent a refreshing, long-awaited statement on the creative potential of design, and thus a departure from the prevailing architectural condition of the region. Slick, slender and subtle in interpretation, the result is an unexpected statement that contrasts with the dull urban surround of an ambitious cityscape.

Over the past two decades, architects and consultants in the UAE have often complained either of the clients' preconditions, which they claim have influenced style taste – resulting in inferior architecture – or of the speed in which they and contractors have had to deliver. The result has been mediocre construction and a hybrid

of ambiguous building styles endorsed by architecturally unqualified developers; this has led to the urban sprawl of new cities. The careless use of expensive materials and



Above
Building façade

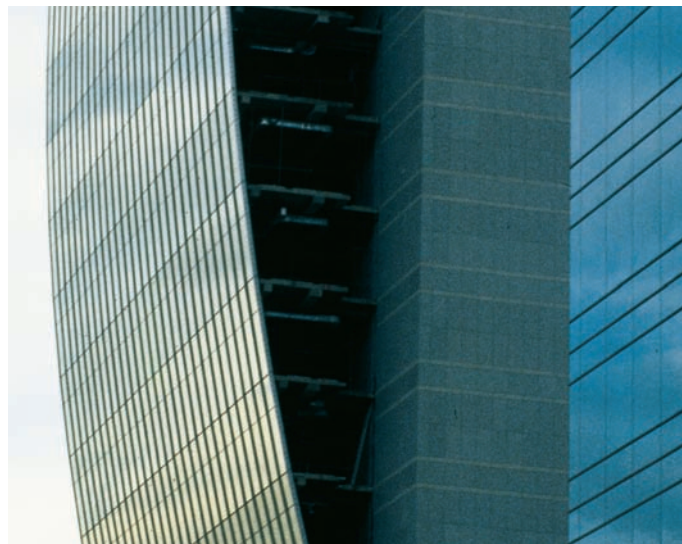
Opposite page
Side view of the slender design of the National Bank of Dubai's creek façade showing the inclination of the curtain wall arc



the poor execution that mark the soaring towers and retail, residential and institutional precincts characterize the deteriorating condition of the profession. By way of contrast, the high-quality construction, architecture and design of the Emirates Towers (which qualified as a 'fast track' project, with a time span of less than four years from preliminary design stage to completion) have created a precedent for the modification of the urban landscape by gradually reversing the 'junk-trend' condition and restoring the credibility of architecture in the UAE.

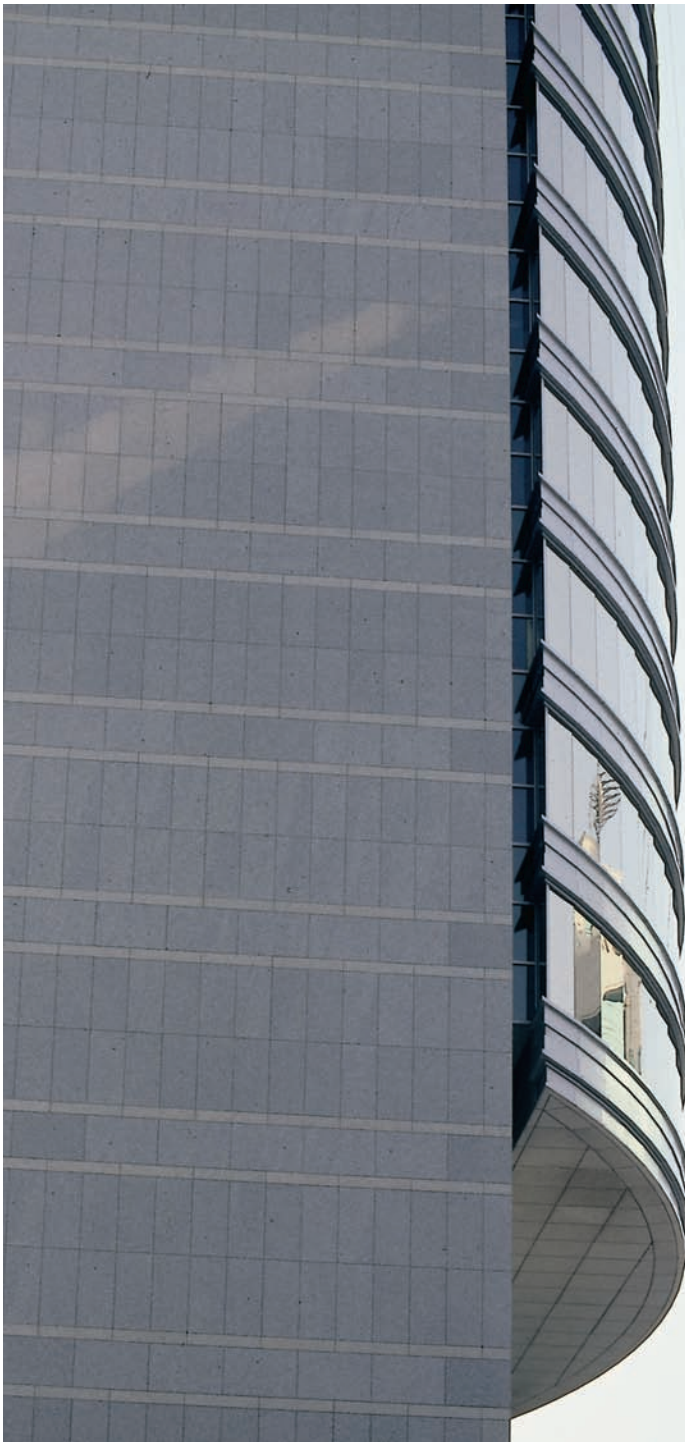
This attractive twenty-storey building, situated on the Dubai Creek, has a stunning profile that is accentuated by the gentle curvature (similar to the arc of the six petals found in the natural division of the primary circle) which its curtain wall assumes. The reflective-glass screen which composes the creek façade is the major focal point of the building. This does not undermine the design structure and architecture of the rest of the building, including the rear façade and entrance to the bank headquarters and offices.

NORR Group won the international competition held for the commissioning of this project with a design by Uruguayan architect Carlos Ott.³⁶ The design concept is based on the traditional *dhow* (*dāw*) that sails Gulf waters. Situated on the creek, the design pays homage to the region's maritime trade. The curved roof of the banking hall (the hull) and the curved golden sheet of glass that makes up the façade (the sail of the *dhow*) are the leading motifs of the design.³⁷ Construction began in 1994 and was completed in mid-1998. The building includes office space and facilities that are predominantly used by the bank, a few leased floors and underground staff parking. As in the Emirates Towers, solid lines, elegant stature and clean finishes dominate much of the overall structure and architecture. An attractive contrast between the arc movement of the creek façade and the straight back defines the form as the façades 'ascend', appearing to be supported by two slender, square, granite-clad blocks rising up on either side of the curtain wall. The design makes a distinct contribution to the creek's urban skyline.



Top
Profile of the National Bank of Dubai

Above
Street and back façade

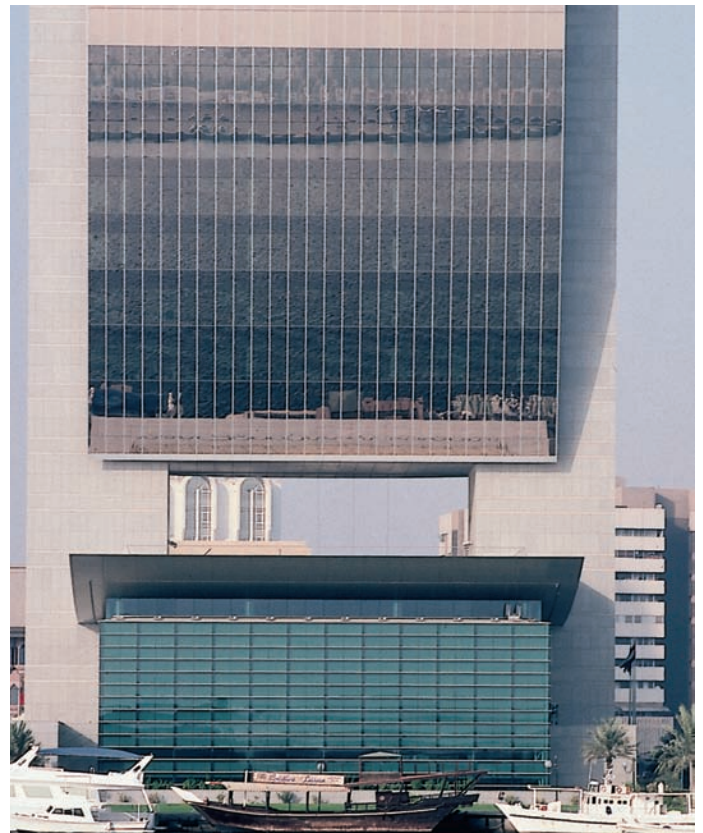
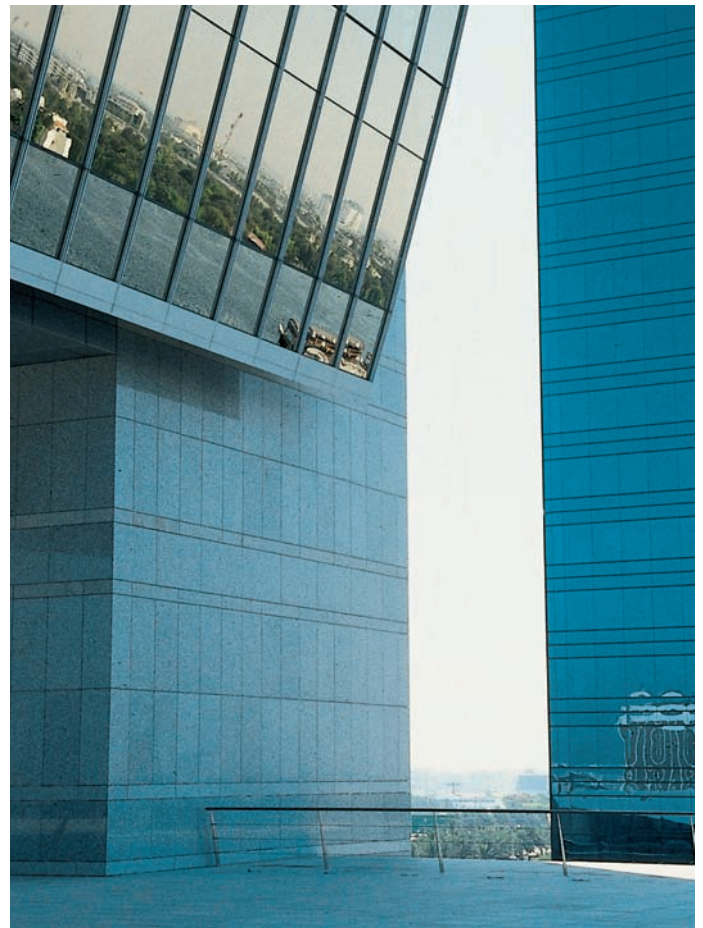


Above

Close-up and detail of the side of the building from the ground, showing a segment of the creek curtain wall façade and the street curtain wall façade

Top right

Detail of the square mass at the corner of the National Bank of Dubai just below the arc curtain wall



Right

Close-up of the Bank's creek façade below the ascending arc wall

Emirates Towers

NORR Group Consultants International Ltd (Toronto and Dubai, 2000); Design Architect: Hazel W. S. Wong

The Emirates Towers project was, according to the architects, envisioned as a major landmark and conceived as a symbol of Dubai's aspirations and change in status from being the Middle East's new commercial and trade centre to 'becoming an international contender in the business world, one to rival Southeast Asian commercial centres such as Singapore'.³⁸ This is enhanced by the city's geographical location as a link between the East, Far East and the Western World, a vision which the client, HH Shaykh Muhammad Bin Rashed Āl Maktūm (Crown Prince of Dubai and Minister of Defence), has consistently focused on in the shaping of Dubai's international rôle and future.

A series of design competitions and re-submissions of proposals took place during the latter part of 1994 and early 1995 for the creation of a 'world-class' mixed-use development. The scheme presented by NORR Group was selected in March 1995. Design development commenced in April 1996, with design architect Hazel W. S. Wong, and construction began shortly afterwards, in September of the same year. Design and construction were to proceed concurrently, as the building was scheduled for completion in June 2000.³⁹ The project was completed two months ahead of schedule.

In an unpublished paper on the project and its design theme, the towers are described by the architects involved: 'More than just a pair of tall buildings, the project's scale and various components can be more suitably described as a "development" that significantly adds to the infrastructure of a growing city in ways similar to the effect Raymond Hood's⁴⁰ Rockefeller Plaza had during the heydays of New York skyscrapers and continues to have to this day.'⁴¹ The architects rightly add that the sheer scale of the project and its 'state-of-the-art features and facilities offer compelling evidence of the city's ... drive to lead the region into the next millennium ... The slender proportions of the towers add further to the impressive massing to create an unmistakable visual representation of Dubai's vision for the coming century'.⁴²

The architects' statement elucidates the *raison d'être* of the client's brief and their response.

That the structural interpretation provided in the slender towers is neither imposing nor overbearing is remarkable. Despite the soaring heights, a measure of scale and proportion, evident in the design lines and maintained in the plan, details and forms, is both commendable and unusual. The client wanted a 'bold statement': such was the response of NORR Group architect Syed Ali al-Karimi to my query about the project's cultural representation and influences. He explained that patterns were abstracted and employed 'as the only culturally sensitive aspect in the design'. This transparency sums up the virtue of the design, reflected in the volume, lines and details.

The twin triangular towers stand on a site measuring 350 x 500 metres, located in a rapidly developing suburb of Dubai adjacent to the World Trade Centre on the main Shaykh Zayed road, a major tower-lined artery leading to the city centre. The development consists of an office tower (355 metres high) and a hotel tower (305 metres high). At the time of the project's completion and opening in mid-2000, the office tower was to claim its place as the tallest building in the Middle East and Europe and the tenth-tallest (office tower) in the world, with the hotel tower claiming seventeenth place on the list of the twenty tallest buildings worldwide. In 1999 the office tower ranked twelfth and the hotel tower twenty-third.⁴³ The office tower (at the time of this review, September 1999) was ranked as the tallest in the Middle East, Europe and Africa, and the project as a whole represented the third-tallest twin towers in the world. The silver-grey, metal-and-glass towers rise out of a low horizontal-stepped granite base to become the focal point of the surrounding skyline.

Each tower is built in the shape of an equilateral triangle, with each side being 55.5 metres. It is thought that the triangle represents an Islamic geometric theme.⁴⁴ The triangular pattern is accentuated throughout the project in the repeating patterns of ceramic fretted glass

Opposite

Panoramic view of the Emirates Towers complex looking east

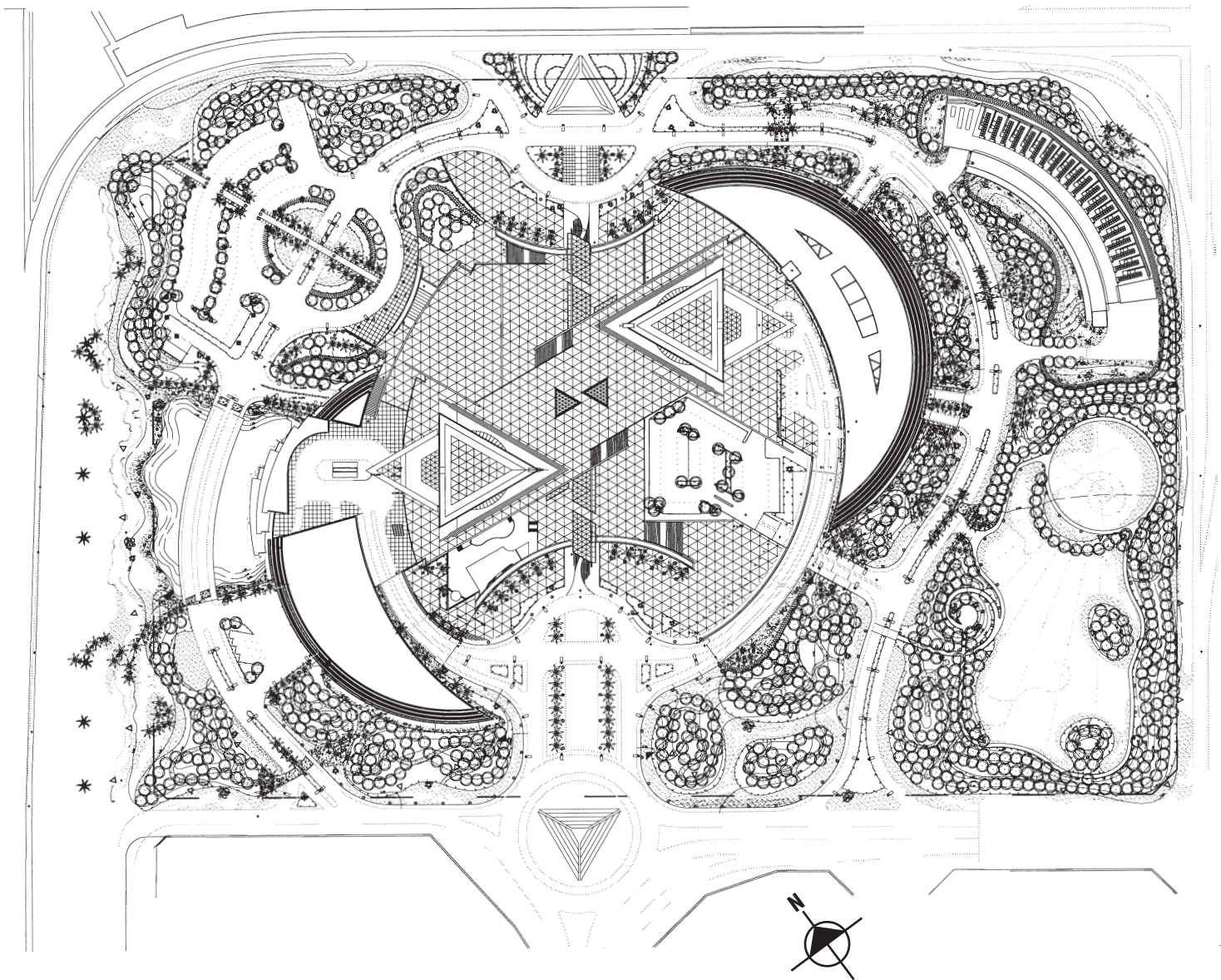




in the towers' slanting roofs, skylights and canopy structures, and extends to the interior and exterior paving patterns. According to the architects, this basic grid geometry is balanced by the contrast found in the curves of the base structure's north and south granite-clad walls, the large cascading waterfall in front of the hotel entrance and the delicate lines of the marble-inlaid geometric patterns used in paved circulation areas in the interior. The lobby space leads from the entrance to a central core of 16 lifts which serve the four financial

institutions in the respective tower zones. Each lift travels at a speed of up to seven metres per second.

The approach to the 54-storey office tower is by a ramped driveway that leads to the skylit space of the entrance lobby, with its fine-quality granite, back-lit stained-glass feature and marble flooring throughout. Two attractively designed water features, running either side of the entrance, complement the generous space that, with its sculpted cherry-wood bench, functions as a waiting area.



Opposite

The twin Emirates Towers looking north with the low horizontal podium of the retail and parking areas

Above

Emirates Towers site plan showing the whole complex, the office tower located to the north-east and the hotel tower to the north-west



The lower segment of the building consists of circular floor plates forming a drum of clear glass eight storeys high. The triangular geometry of the tower above is made apparent at the drum level by three 'legs' that straddle the circular floors.

A typical floor plate is 1,334 square metres (gross) and is designed to provide maximum flexibility in the use of floorspace with a minimum number of columns. The floor-to-floor height is 4.5 metres. The tower is designed with access flooring throughout in order to accommodate state-of-the-art information technology and building services. Dominated by precision, clean lines and attention to detail, the interior space of the office tower echoes the exterior.

The hotel tower's main entrance leads to the split-level, skylit lobby containing the Palm Court (lounge and café) and hotel reception with an eight-storey atrium (around 30 metres high in total, and the floor-to-floor height is 3.6 metres). Black granite cladding, cream marble flooring, Angree wood panelling and chrome and stainless steel combine in the interior finishes of the space. The restaurants and retail malls as well as the function and banquet hall – which includes a ballroom – on the lower level are accessed through the lobby via separate escalators and grand staircases respectively. The ballroom, 900 square metres, can also be accessed by a separate entrance located to the south. A second upper atrium soars 111 metres above, opening onto guest rooms and suites.

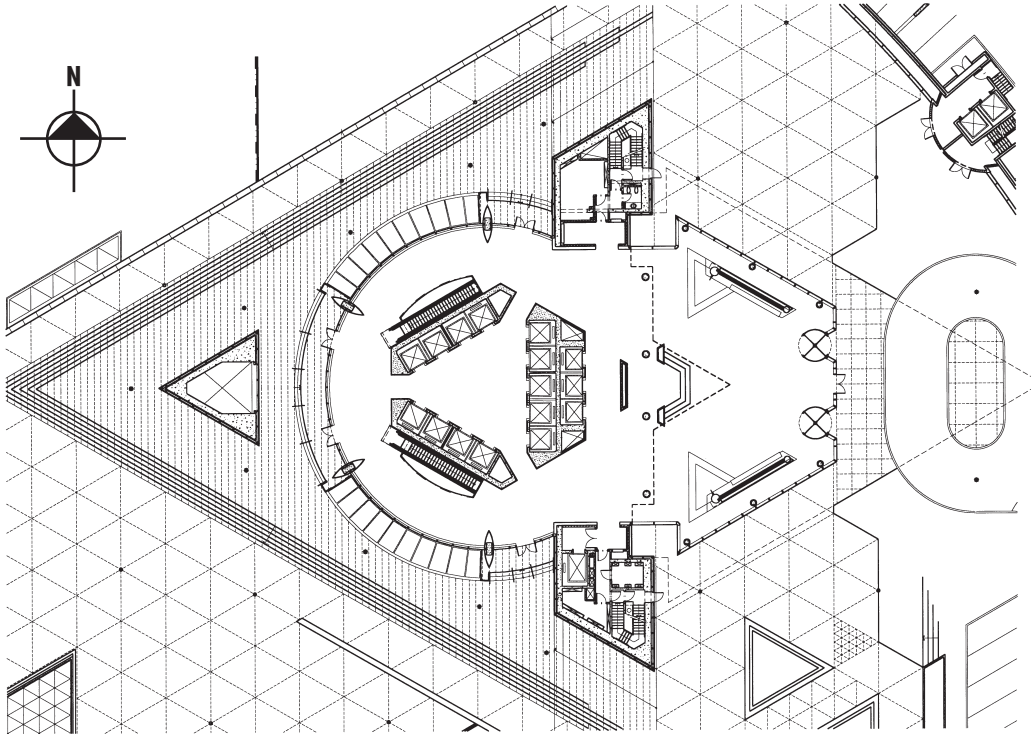


Top left
View down Shaykh Zayed Road

Left
Street level close-up view across from Shaykh Zayed Road showing the Emirates Towers hotel tower on the right and the office tower to the left

Opposite
Office tower: entrance lobby and reception area showing the wood panelling framed in aluminium. The photograph is taken from the fountain bench in the foreground. The skylight's space frame is in glass and stainless-steel cables with the framing members in regular painted steel





Left

Office tower: main entrance floor plan

Bottom left

Office tower: close-up of glass frame skylight in the reception area

Below

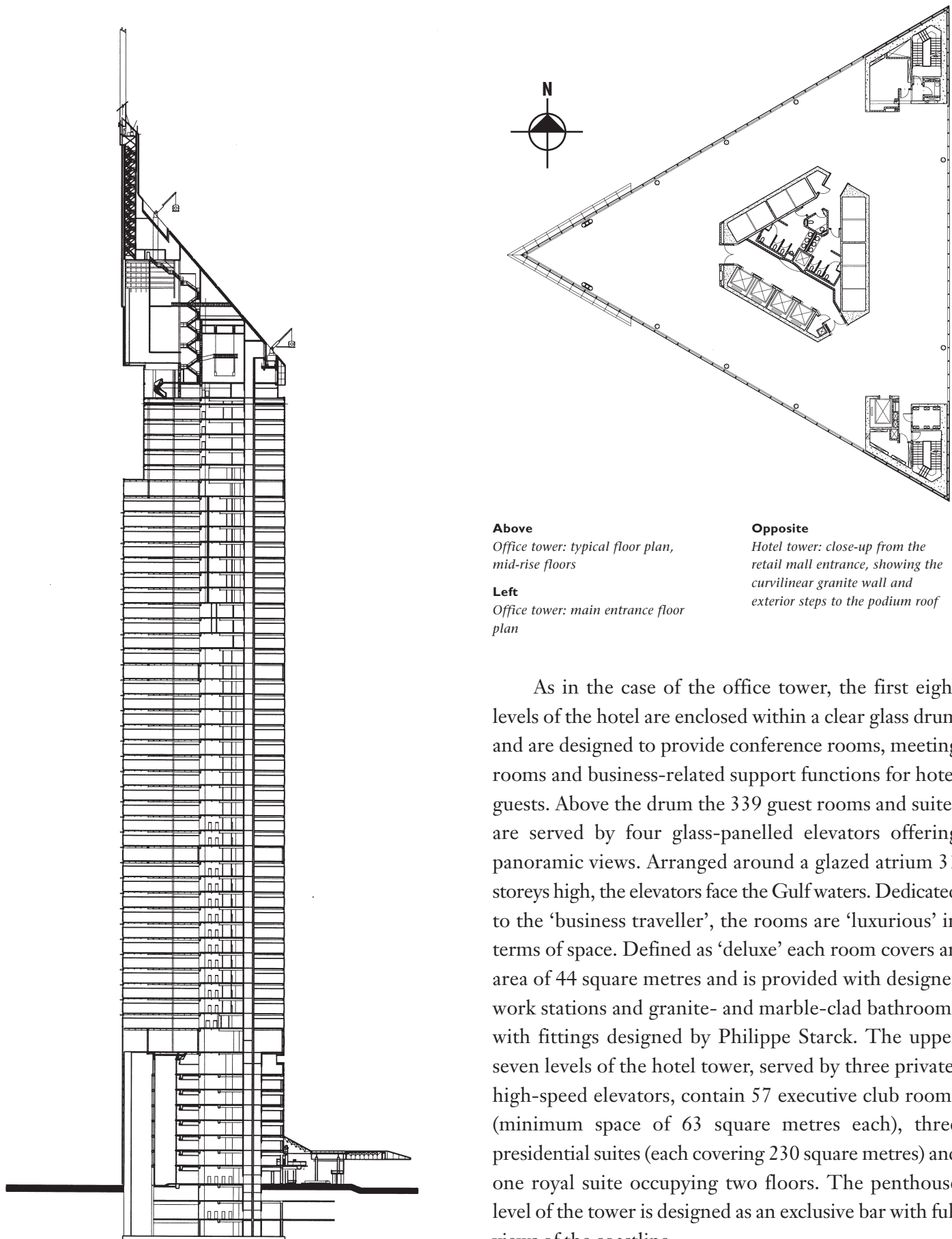
Office tower: close-up of water feature and fountain in the entrance lobby

Opposite

Office tower: lift lobby, with stained-glass skylight, marble flooring pattern, Brazilian granite-clad walls and stainless-steel lift panels





**Above**

Office tower: typical floor plan, mid-rise floors

Left

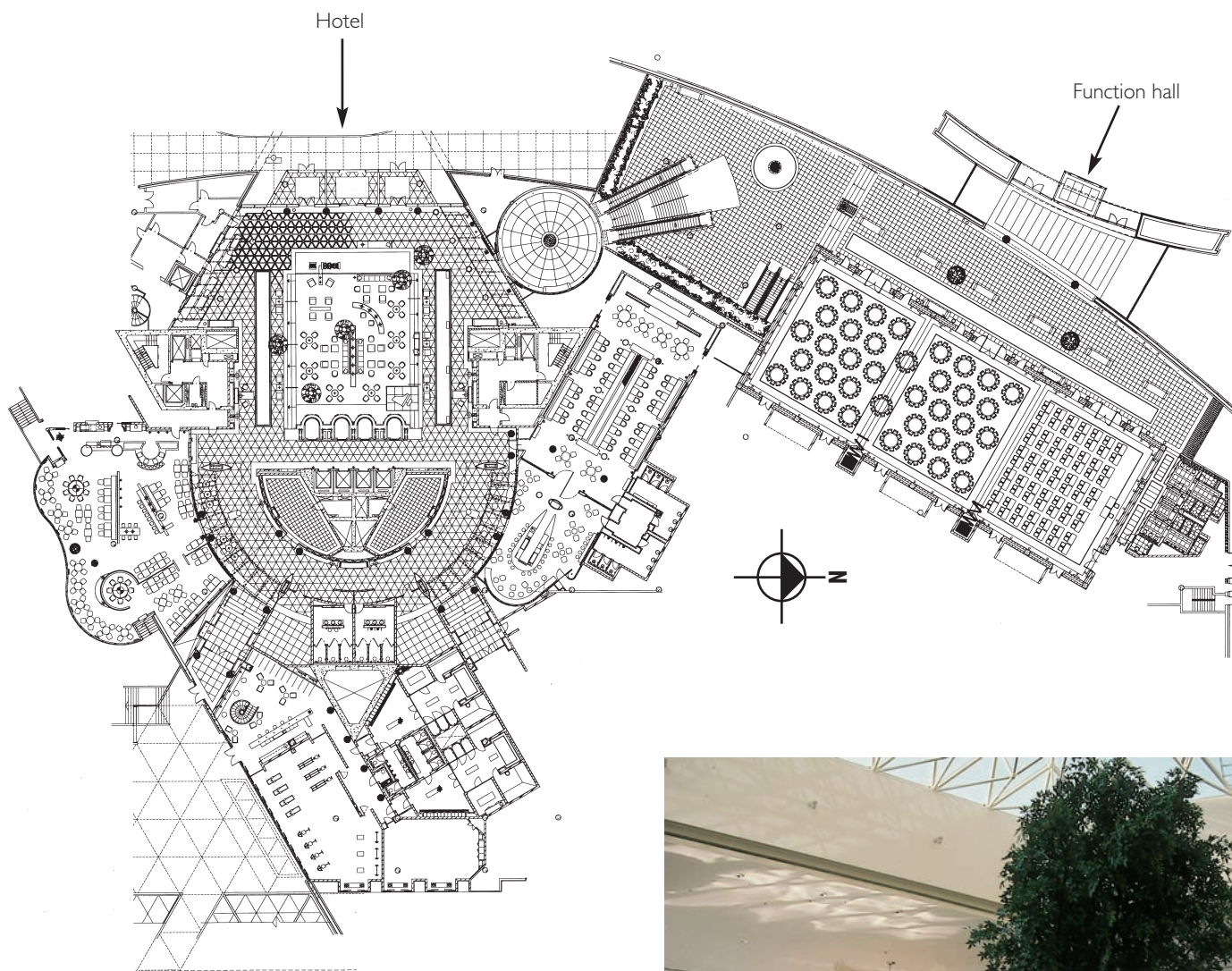
Office tower: main entrance floor plan

Opposite

Hotel tower: close-up from the retail mall entrance, showing the curvilinear granite wall and exterior steps to the podium roof plan

As in the case of the office tower, the first eight levels of the hotel are enclosed within a clear glass drum and are designed to provide conference rooms, meeting rooms and business-related support functions for hotel guests. Above the drum the 339 guest rooms and suites are served by four glass-panelled elevators offering panoramic views. Arranged around a glazed atrium 31 storeys high, the elevators face the Gulf waters. Dedicated to the 'business traveller', the rooms are 'luxurious' in terms of space. Defined as 'deluxe' each room covers an area of 44 square metres and is provided with designer work stations and granite- and marble-clad bathrooms with fittings designed by Philippe Starck. The upper seven levels of the hotel tower, served by three private, high-speed elevators, contain 57 executive club rooms (minimum space of 63 square metres each), three presidential suites (each covering 230 square metres) and one royal suite occupying two floors. The penthouse level of the tower is designed as an exclusive bar with full views of the coastline.





Above
Hotel tower: general floor plan of lobby and function area at entrance level

Below
Hotel tower: close-up detail of the marble floor with its geometric pattern in the lobby lift area in the hotel atrium



Opposite page
Hotel tower: atrium looking up with the lift rails to the right

Right
Hotel tower: entrance lobby and Palm Court







The two towers are connected via the three-storey base, which accommodates the retail shopping on its main level as well as the hotel's leisure facilities. With a retail area in excess of 5,000 square metres, the primary shopping artery is laid along a north-south axis via a series of skylit courtyards and a central rotunda, from which the mall's upper level can be reached. The remaining base area comprises a double-height function/banquet hall, support areas for office, hotel and retail components and underground parking for 400 shoppers' cars. Two curvilinear structures, 'reminiscent of massive shifting sand dunes', surround the project to the east and west (providing a further 1,000 parking spaces for the towers and service areas). An internal ring road is set amidst 17 hectares of lush landscaping and contouring, thus accentuating the surrounding arid expanse.

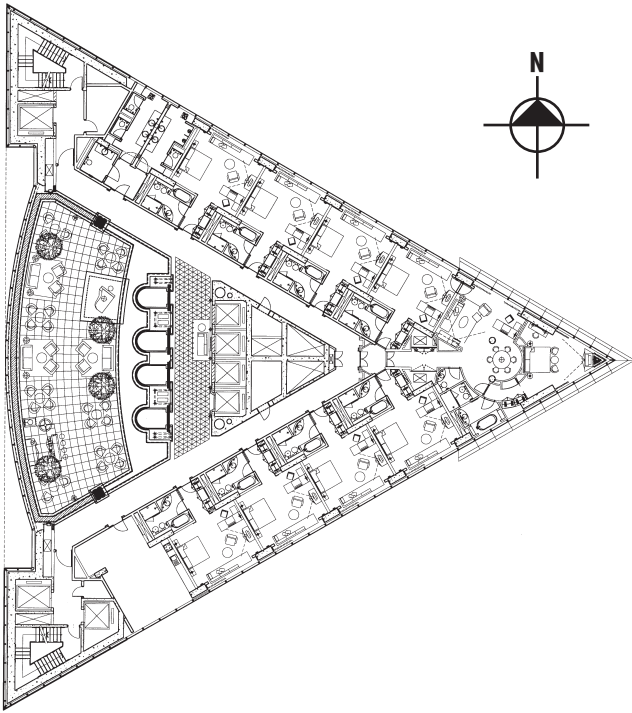
Top

Hotel tower: view of the atrium looking down to Palm Court

Right

Hotel tower: detail of the atrium looking down through the entire depth of the building

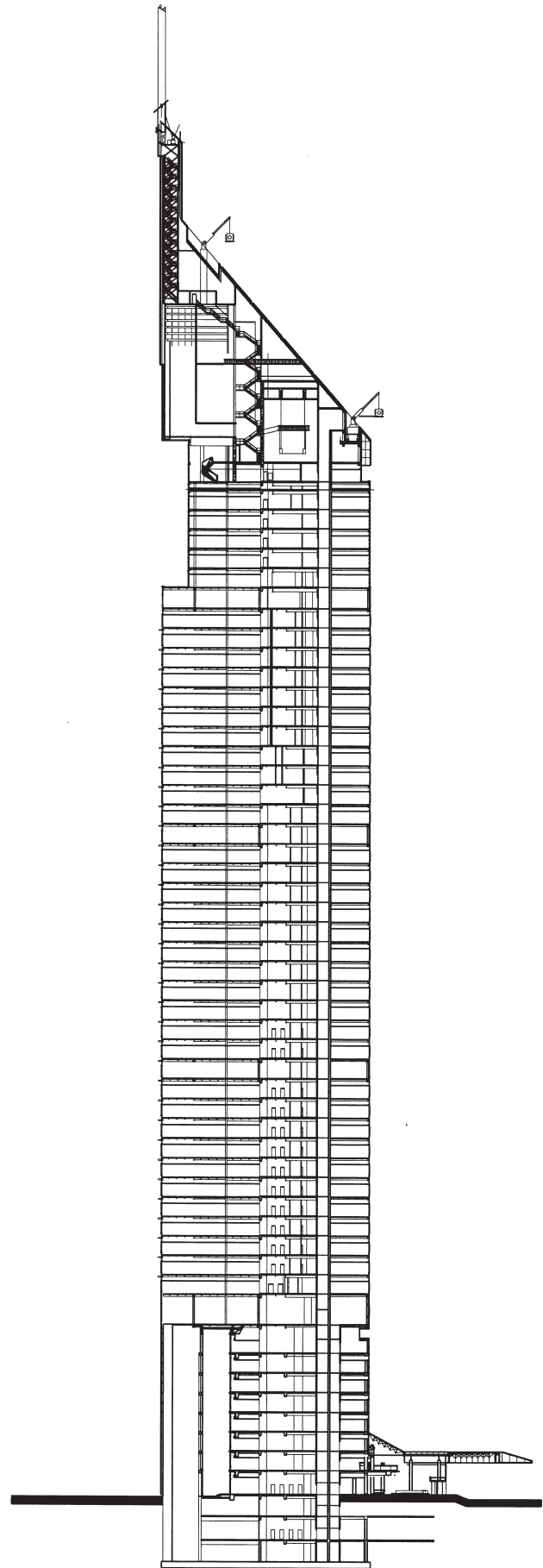




Top
Hotel tower: floor plan of the lounge and typical guest rooms (Level 11)

Above
Hotel tower: detail of the lift shaft and steel-rail structure opening on to the atrium at the upper-floor levels

Right
Hotel tower: east-west section





Above

Close-up of the glass and steel-frame skylight in the retail mall



Left

Interior view of the retail mall looking towards the entrance

Jumeirah Beach Resort

WS Atkins and Partners Overseas (Dubai, 1997)

Architects: Tom Willis-Wright, Kevin Cook

Design Manager: Simon Crispe

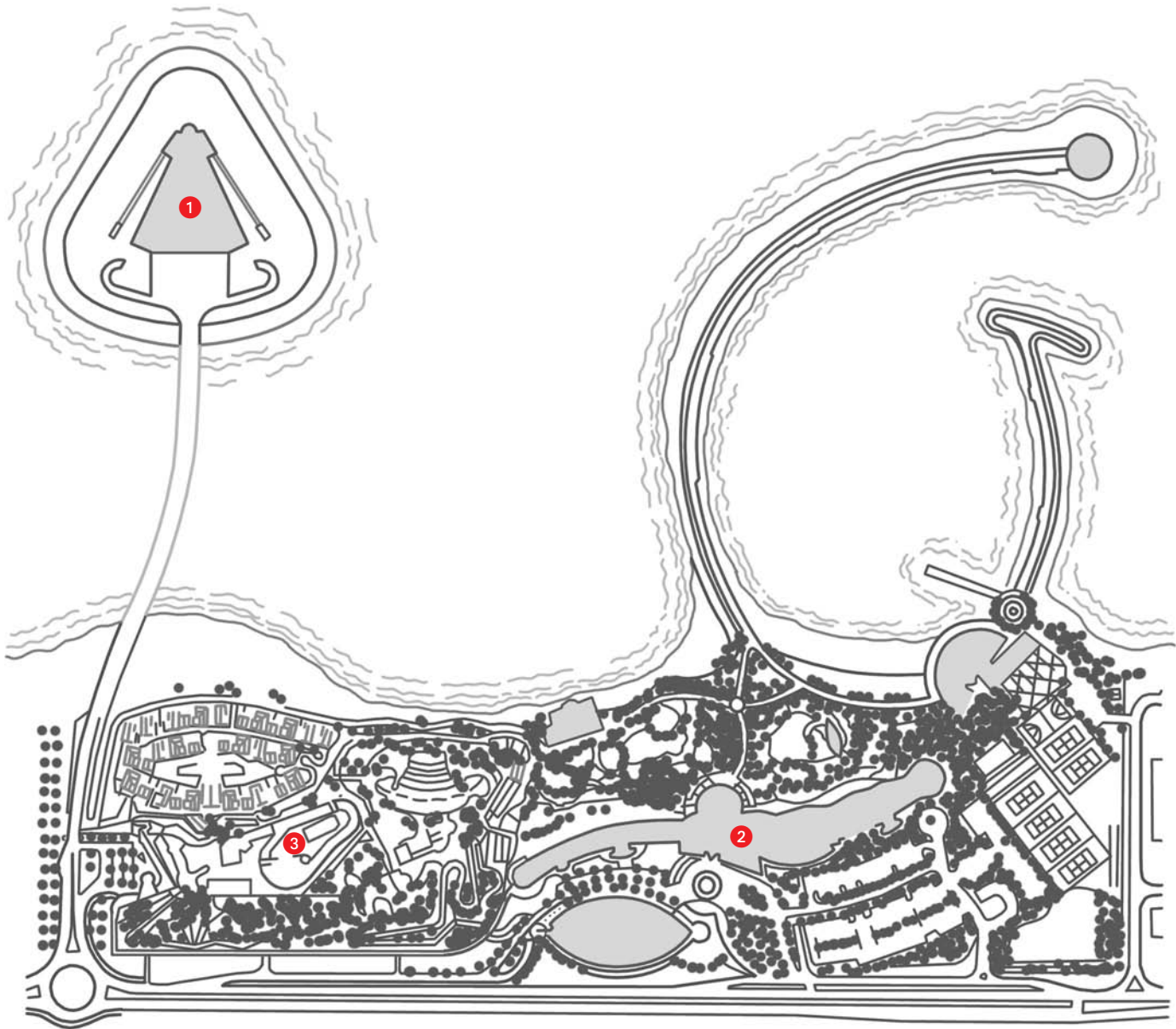
In October 1993 the British firm WS Atkins began working on the Jumeirah Beach Resort project in Dubai. The client was HH Shaykh Muhammad Bin Rashed Āl-Maktūm. The scheme included the Jumeirah Beach Hotel,⁴⁵ Burj al-Arab (intended as ‘a landmark tower hotel’), and the Wild Wadi,⁴⁶ a state-of-the-art water theme park, all on one 26 hectare site on the shores of the Arabian Gulf in Dubai.⁴⁷ For the whole development,

WS Atkins,⁴⁸ as the lead consultant, provided design, architecture, engineering and construction management. The Jumeirah Beach Hotel, designed in the shape of a breaking wave, was opened in November 1997. Burj al-Arab, ‘the Arab Tower’, is the highlight of the project. Opened in December 1999, this extraordinary tower, 321 metres high, designed in the shape of a giant sail on a triangular plan, fulfils the client’s brief to construct a landmark building in Dubai. Hailed at one time as the fifteenth tallest building in the world, and the tallest

Below

The Jumeirah Beach Resort and the Burj al-Arab site plan.

1. Burj al-Arab Hotel 2. Jumeirah Beach Hotel 3. Wild Wadi



single-structure hotel,⁴⁹ it has been constructed on a man-made island, 300 metres out to sea. The building has come to symbolize Dubai's 'international business and tourist trade status' and, more importantly for the Emirates, is a monument of pride corresponding with the order of the 'new millennium'.

Jumeirah Beach Hotel

A 26-storey curved mass in plan, the elevation and structure was designed to represent a breaking ocean wave. Situated in a southern upmarket residential- and beach-club suburb, the building, or wave, is 93 metres high and 275 metres long. In the middle lobby space the central atrium, designed to resemble a geometric petal, rises up from the reception area though to the upper 26 storeys. The east-facing wall of the atrium, 90 metres high, is decorated with a satellite view of the earth, a galaxy of the stars, and a moon in orbit, depicted in relation to the UAE. The 600 guestrooms and suites, all with views of the sea, occupy the two curves of the 'wave' that extend north-east and south-west. These are reached on each floor from the west- and south-west facing gallery surrounding the atrium, where the lifts are found.

Following the initial concept study, the architects researched the hotel's structural resistance through



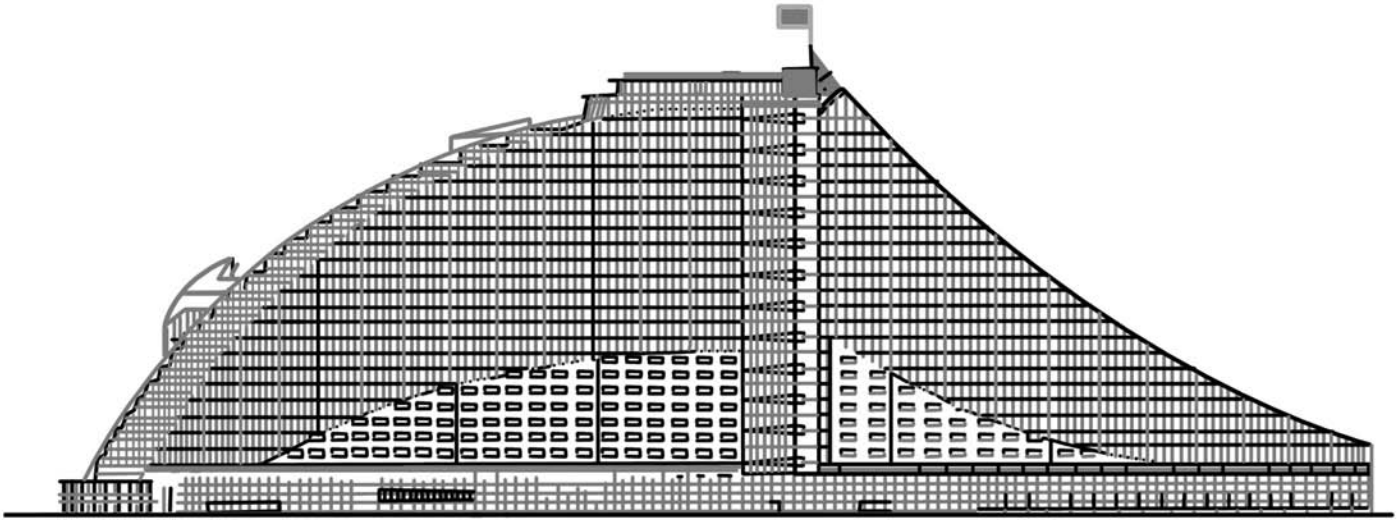
Above

View of the north-extending curve of the wave, taken from the hotel atrium

Below

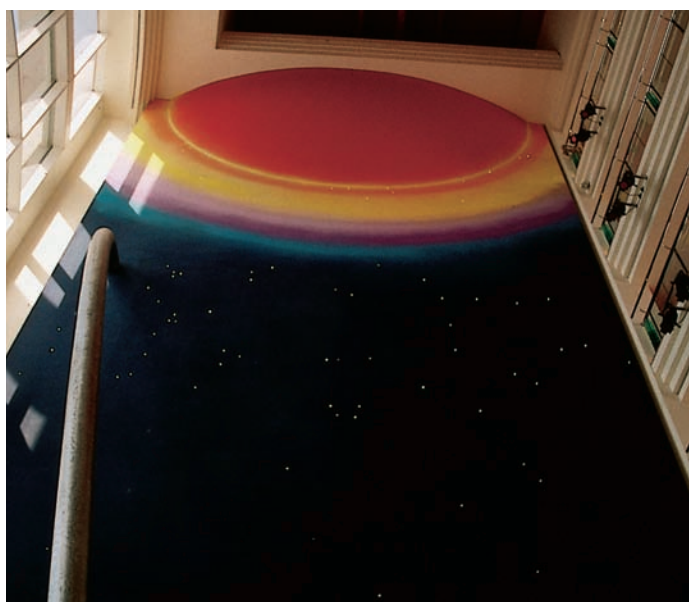
Arabian Gulf façade of the hotel: 'a breaking ocean wave'





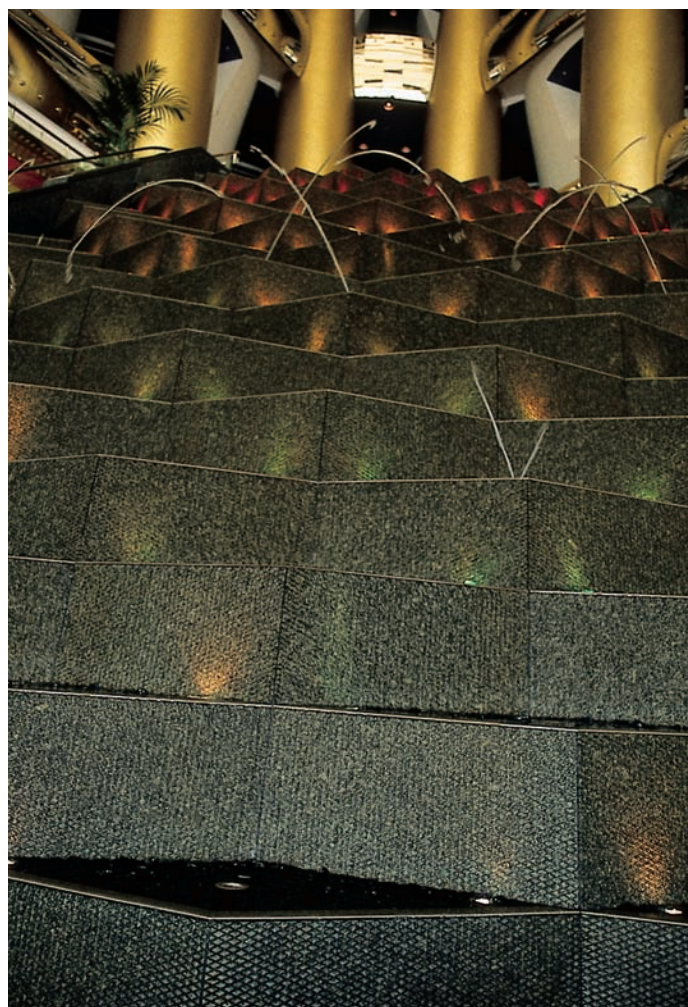
Top
Arabian Gulf-side elevation of the Jumeirah Beach Hotel: the 'breaking wave'

Above
Elevation of the Jumeirah Beach Hotel from the land



wind-tunnel simulation of models testing against the local Shamāl (northern wind). This helped reinforce the construction technique used for the entire hotel. The superstructure of the hotel has been built from nine pieces, which have been joined together by special seismic joints. These pass through every part of the building and are visible only as vertical bands in the external cladding. To compensate for the narrow width of the building, a series of sheer walls were used to strengthen the cross section.⁵⁰

The resort complex is surrounded by lush landscaping with facilities including several indoor and



Above

Detail of the water feature in the hotel entrance foyer, located between the escalators

Top left

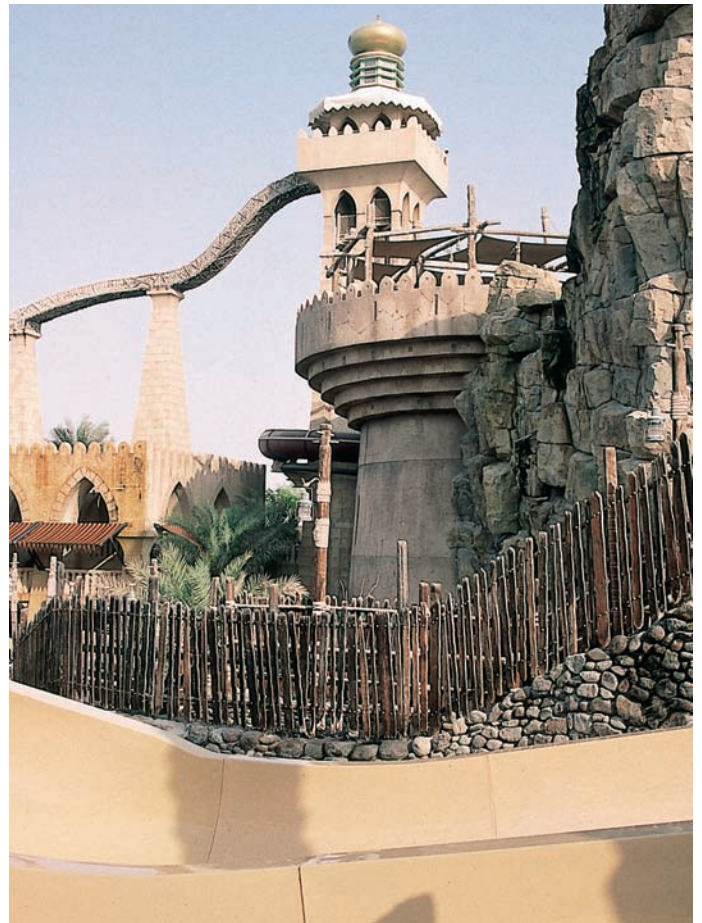
Detail of the atrium wall depicting the earth and its orbit; the lit protruding pole marks the location of the UAE

Bottom left

The top of the orbit wall ends with the sun just below the ceiling

outdoor bars, restaurants and a three-storey conference centre with state-of-the-art exhibition and banqueting facilities. Three swimming pools are located between the hotel and the coast, with separate sports club facilities and tennis courts adjacent. A 53-hectare marina encloses two breakwaters accommodating small craft and facilities for large-berth mooring crafts.

Complementing the hotel is a secluded house-type accommodation with a six-star rating, completed in the summer of 1999. Situated beyond the Wild Wadi site, and serving as a 'traditional' backdrop, are nineteen private villas called Bayt al Bahr, 'the sea house'. Set on 5



Top left

View of the Jumeirah Beach Hotel's slim wave-like stepped side wall from Bayt al Bahr

Left

View from the atrium's glass frame structure looking towards the pool and landscaped grounds on the Gulf shore

Top

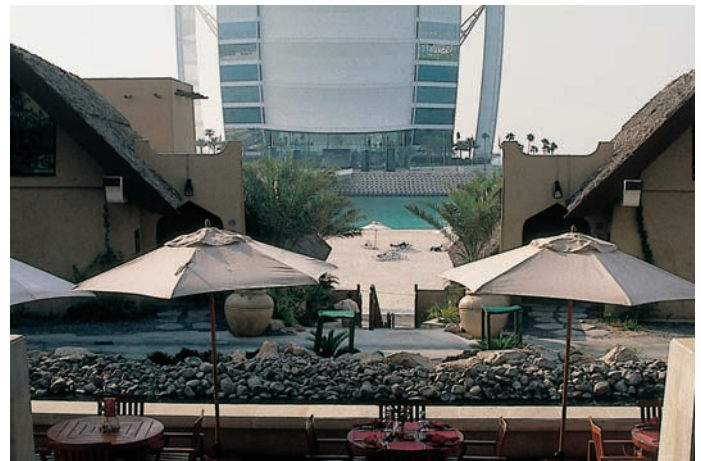
View of the Bayt al Bahr villas taken from the Burj al-Arab. The Wild Wadi tower structure and hanging water slides can be seen in the background

Above

Close-up of the Wild Wadi tower immediately behind Bayt al Bahr



hectares of land, the Arab village setting, with its cluster planning and enclosed walls, narrow concealed paths and walled gardens, was, according to the architects, 'inspired by the local architecture of heritage sites such as Hatta'. However, the architecture of the wooden strut houses is of vernacular Indonesian style, with a sun-baked, adobe finish and thatched-palm roofing, '*arish*'. In the interior, the sober and unassuming furnishings and detailing are novel in spirit. Fine Tabriz Persian carpets, original Omani chests and fabrics of subdued colours combine with the minimalist carved wall friezes typical of east Arabian architecture and Arab-style *majlis* seating. The exceptionally well-designed bathrooms confirm the contribution of the architects to the interior. Situated in landscaped gardens, each house has its own terrace overlooking the sea and a private pool. The only joint



Above left

The private street in the Bayt al Bahr complex

Top

View from Bayt al Bahr's main restaurant area across to the Gulf entrance of the complex, with the Burj al-Arab in the background

Above

Main pool of the Bayt al Bahr complex and surrounding thatched-roof housing

facilities, the main restaurant and a swimming pool, are located in the middle of the cluster and are accessed either directly from the houses or from the two main entrances located at the back and sea front of the site. The walled arrangement of Bayt al Bahr, fronting the Wild Wadi on the south-west, forms the last block before Burj al-Arab.



Top
 Three of Bayt al Bahr's houses surrounded by the landscaped streams and marshes

Above
 Entrances to two houses in the Bayt al Bahr complex

Right
 Back entrance to the main central area in Bayt al Bahr showing the truss roof and column detailing



Burj al-Arab

The first design blueprints were prepared by WS Atkins in 1994, and work began in 1995 to construct the triangular island. Built on a piled raft, 2.7 metres thick and approximately 6,000 square metres in area, the main triangular-shaped tower structure was built and completed in September 1999. In addition to the design, WS Atkins provided and managed the construction services. The total time taken to complete Burj al-Arab was five years, with 3,000 companies involved in the project. The brief was to create a super-luxury, all en suite hotel, branded as '7 star', an icon for Dubai.

The 28 double-storey floors accommodate the 202 bedroom suites. The tower is 321 metres high, and is built on the specially man-made landscaped island off the Jumeirah coastline. 'With state-of-the-art technology for guest interfaces, this hotel was designed to establish a world landmark and the ultimate in service.'⁵¹ The hotel also offers three richly decorated restaurants, a seaview restaurant on the twenty-seventh floor, one which takes up an entire floor, and one underwater which houses indigenous fish in 1,150 cubic metres of water in three reef aquariums 'accessible only via a submarine-styled ride'. A sumptuous, Petra–Moroccan inspired health suite is situated on the eighteenth floor.



Above left

The north-facing façade of the Burj al-Arab from the marina restaurant

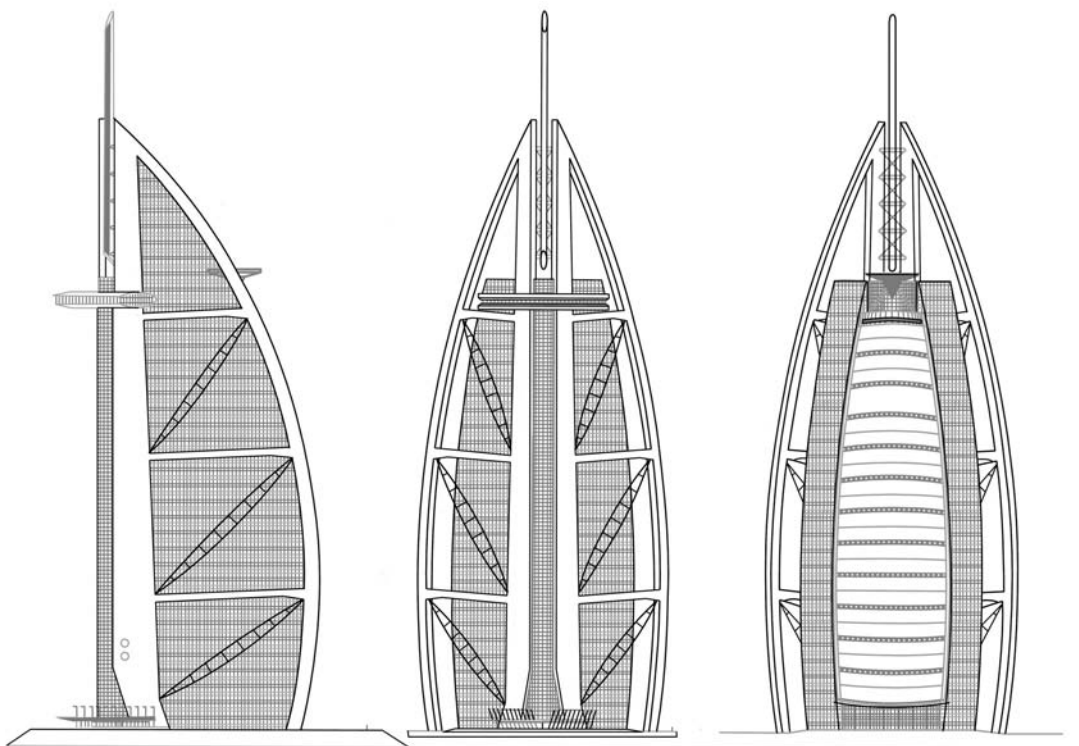


Above right

Burj al-Arab from the Jumeirah Beach Hotel

Opposite

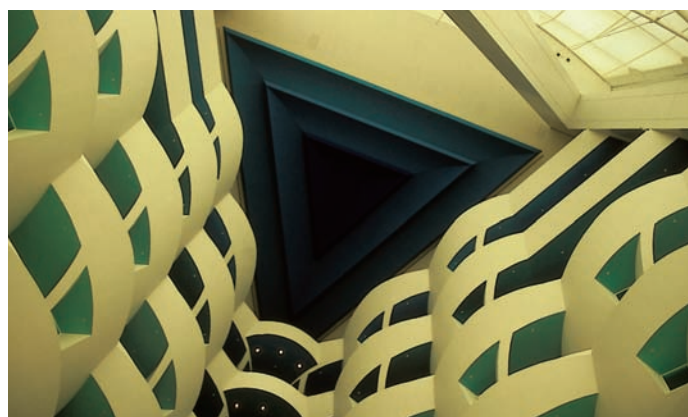
Land-side (south-east) façade showing the bridge connecting the island between the Gulf and the main entrance level. The elevation shows a full view of the white atrium and curved Teflon-coated and woven-glass-fibre wall



Left

Elevation: north-facing side of the building, Gulf-side elevation and front land elevation





Top left
Detail of the north-facing façade from ground level

Left
The traditionally styled atrium showing the spa floors with Moroccan details and horseshoe arches

Above top
Close-up of the north-east facing side, looking up

Above middle
The triangular ceiling of the tower from the interior

Above
Interior view and detail of the mosaic-clad columns of the spa pool

Built on sand, the building is supported on 250 columns, 1.5 metres in diameter, that extend 45 metres under the sea. As there is only sand to hold the building upright, the columns rely on friction. Full-height atriums are enclosed in Teflon-coated woven-glass-fibre curved walls. The accommodation wings enclose two sides of a huge triangular atrium that runs up the full height of the accommodation floors. The third side, facing the shore, is enclosed by a double-skinned, Teflon-coated woven-glass-fibre screen made of glass-fibre fabric 1 millimetre thick with a Teflon coat to prevent the dirt sticking. The screen is hung from the top of the building with over a kilometre of cable 52 millimetres thick and, according to the architects, it is the first time such technology has been used in this form and to this extent.

The atrium was designed to be the tallest in the world at 182 metres high, soaring up the centre of the 'sail'. The service lifts travel at a speed of 4 metres per second, the panoramic lifts at a speed of 5 metres per second and the guest elevator at 7 metres per second.

The technical details of the atrium-wall fabric are explained by David Dexter:⁵²

... the solution to overcome the complex 3-dimensional shape of the hotel atrium wall whilst maintaining the overall sail-like form of the building, was to provide a series of shaped membrane panels that could be patterned to the defined geometry. The membrane is constructed from two skins and pre-tensioned over a series of trussed arches visible from the atrium. The arches span up to 50 metres between the outer bedroom wings of the hotel which frame the atrium, and are aligned with the vertical geometry of the building. The trussed arches which can extend out from the supports by up to 13 metres are supported vertically at the 18th and 26th floors by a series of cross-braced bars. An expansion joint is provided for the full height of the building on the right-hand side of the wall. This enables the building to 'breathe' under wind loads and avoids the exertion of large horizontal loads on the relatively weak bedroom structures.

A helicopter pad protrudes on the exterior of the south-east facing wall of the atrium's Teflon screen wall, fixed to the top segment of the truncated roof, and below the apex of the sail's pointed arcs. From the ground it resembles a horizontal satellite dish, attached by two lynch pins to the frame of the steel structure.

Special-effect lighting illuminates the exterior tower structure, dramatically accentuating its form with changing colour patches in hues of purple and green. The lighting operates in a continuous single movement, running up the edges of the frame, and is visible for miles at night.

Internal water features

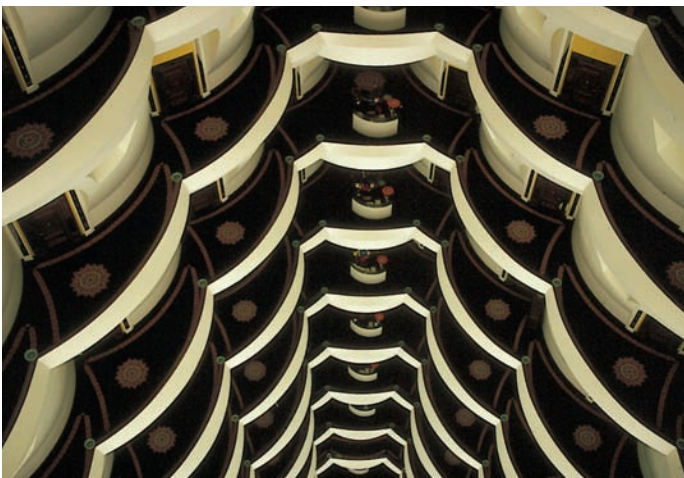
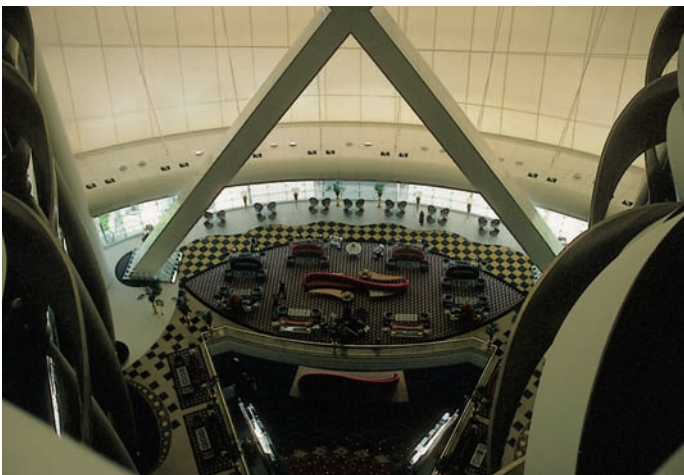
The water features conceived by WET Design, an American company, achieve a system of order in the water molecule through 'lamina-flow technology', as discovered by Mark Fuller, who then designed the system here. The features upon entering the tower generate a 'show' which becomes a central focal point within the vast space of the atrium lobby. The design overview, explained in the text produced by WS Atkins, provides an insight into the delicate order and precision manifest in the captivating geometry of the water patterns and movement. This is explained by the design originators:

The Atrium Water Feature is conceived as a water sculpture that visually engages the visitors.



Above

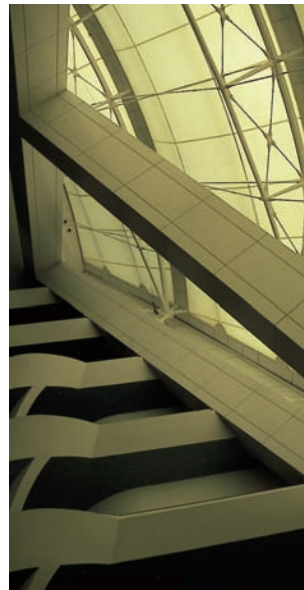
View of the water feature in the lobby of the mezzanine level, opening onto the atrium in front of the lift area



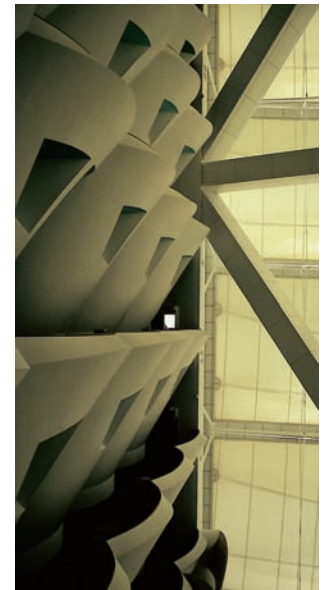
Top
Detail of the water feature's basin showing the geometric configuration and illuminated star pattern in the centre with the water jets shooting out in interlaced arcs

Middle
View of the atrium looking down to the entrance foyer's ground and mezzanine levels

Above
View showing the galleries of the accommodation floors looking down through the atrium from above



Above
Detail showing the conjunction of one of the tower's walls and the atrium's white Teflon screen

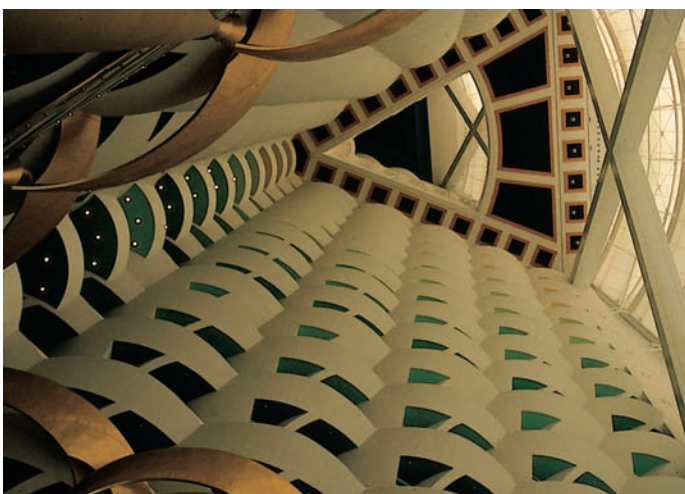
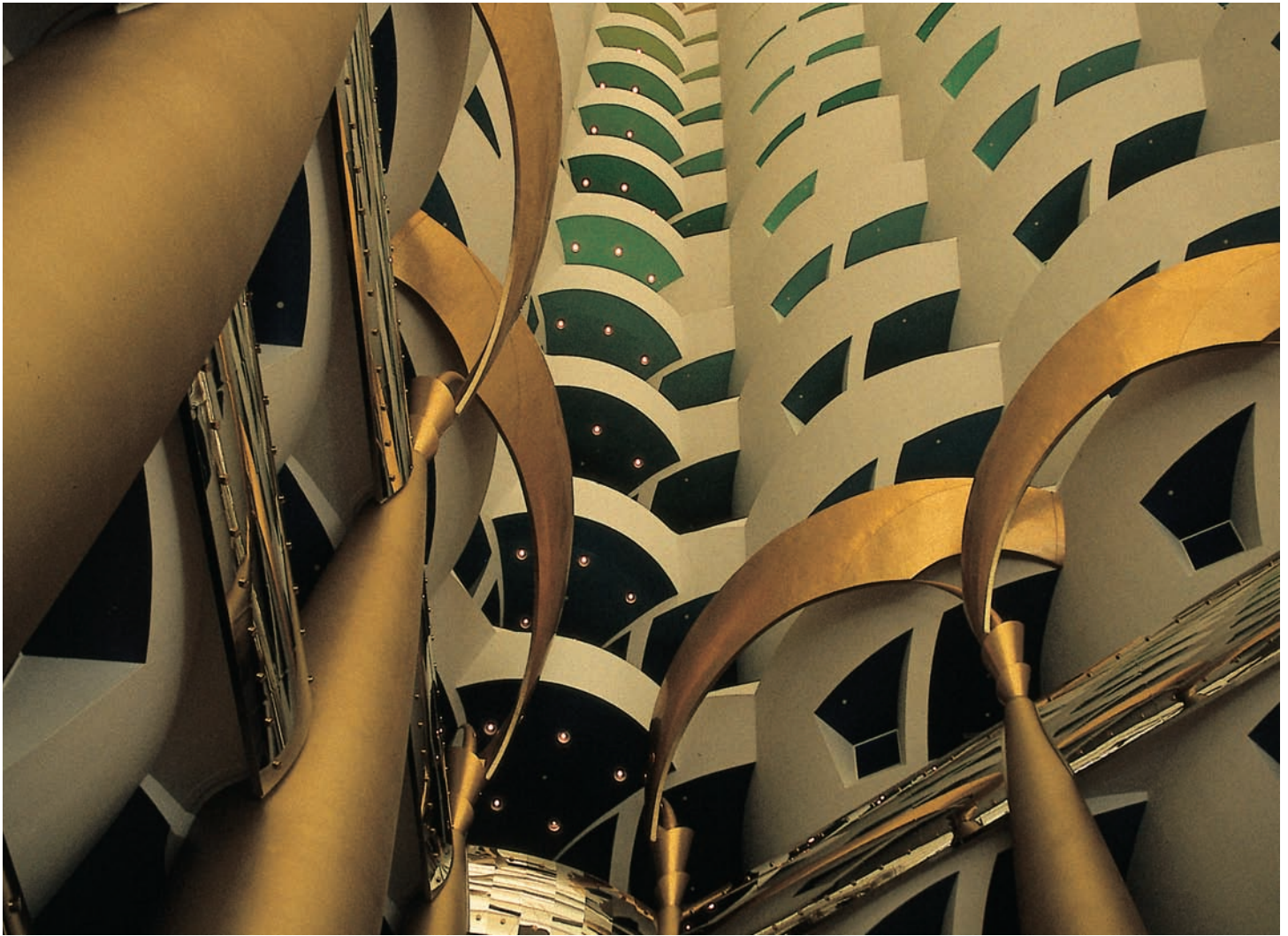


Above
Detail of the atrium's Teflon screen and the projecting galleries of the north-facing accommodation floors

Centrally placed within the atrium space, the circular-form water feature is composed of 24 white fibre optic lit water arches, identified as 'LeapFrogs',⁵³ that surround a gently sloped bowl of multicoloured crushed glass aggregate. A powerful column of water, the 'HyperShooter', surrounded by six smaller 'MiniShooters', forms the central focus of this feature. The sloped plane of the catchment bowl terminates at a shallow pool in the centre of the feature.

Rising from the bowl and encircling the sloped plane, the laminar streams create water arches in interlaced geometric (three-dimensional Islamic star pattern configurations). Illuminated both by uplights and white fibre optic lights, these water streams create crystalline water arches (intersecting in an ordered flow) within the atrium space.

Periodically, as part of a choreographed sequence, the HyperShooter erupts from the shallow pool to a height of 30 metres, like an indoor geyser. This energetic column of water shatters into a myriad of sparkling droplets and is illuminated by a ring of white uplights. The HyperShooter can be adjusted to project the

**Top**

Arched braces above the atrium's mezzanine level and a view of the projecting galleries of the accommodation wings

Above

Detail looking towards the top of the building showing the conjunction of the two walls and the atrium screen

water column to a maximum height of 50 metres up into the air.

The Cascade Water Feature produces a waterfall descending from a height of 7 metres. Divided into steps of varying height, increasing down the slope to create a three-dimensional elliptical surface. The fan-shaped waterfall is located between the two escalators that link the ground and first floors. The use of brightly-coloured crushed-glass aggregate, contained in 80 diamond-shaped water catchment trays of varying sizes, combine with a light show to provide a dramatic effect on first entry into the Atrium Lobby.

The feature comprises controlled falls of water over diamond tiers of glass aggregate onto inclined grooved green/grey granite slabs, which

create a shimmering water skin as a backdrop to the active laminar stream presentations on each level. The feature contains 24 pairs of coloured fibre optic lit LeapFrogs, each pair designed to collide creating a bright spark effect as the fibre optic light disperses at the intersection point. The spark is further highlighted by dimmable, coloured uplighting.

Operation of both features is computer controlled so as to choreograph an array of different sequences and patterns in the displays. Light and movement are combined with the sound of the impacting water streams to maximum effect – parts of the sequence even sound like hand-clapped rhythms. Viewed from high above at the top of the atrium, the colour and light of the features continue to form a pattern and focal point for the whole space.⁵⁴

The endorsement of the Jumeirah Beach Hotel and Burj al-Arab has been accompanied by generous Arab hospitality and high occupancy rates have been encouraged by special package offers, both touristic and commercial.⁵⁵ However, architecturally, Burj al-Arab in particular will undoubtedly go down in the history of Arabia as a monument of circumstantial folly, a contradiction of sorts, considering how well-designed and impressive the construction ultimately proves to be. In a similar vein, the attempt to justify the project as a monument draws parallels with London's Millennium Dome, the difference being that the exclusive function of Burj al-Arab is to endorse a particular lifestyle in a wealthy oil region, one that is characterized by an increasing per capita income. Looking beyond the structure, what may justify the lifespan or purpose of such a monument becomes irrelevant. This extraordinary investment in state-of-the-art construction technology stretches the limits of the ambitious urban imagination in an exercise that is largely due to the power of excessive wealth.

International in concept, multinational and corporate in its identity, Burj al-Arab at first seems rather incongruous. In architectural terms of reference, how

does a San Tropez 'sail' of steel and concrete assume to be a cultural statement?

In the interior, the furnishings and fabrics, voluptuous gold columns, archways and gilded lift-frames (actually gold-plated in part), mirror panels, granite (*azul bahia*), Carrara marble, and mosaic-tiled inlays all combine with ordered water features and a welcoming scent of sandalwood.⁵⁶ The result is a baroque effect, transient with a deliberate touch of ultra- or post-kitsch, a soft flamboyant vulgarity with a 1990s edge. This approaches the flair of Philippe Starck, but lacks the design edge of the furniture, accessories, and the innovative originality established in Starck's New York and London hotel interiors. Emulating the quality of palatial interiors, in an expression of wealth for the mainstream, a theatre of opulence is created in Burj al-Arab. Finally, though striking and jarring, the colour schemes do not impose on the building's relatively simple open design, sharp, slick and soaring curved wall-screen of woven glass-fibre, and eminent frame structure.

Sharjah

American University of Sharjah

Gambert Engineering Consulting and Decoration (Sharjah, 1997)

This project site, branded University City, is located a good 10 kilometres from Sharjah, and encompasses the University of Sharjah, a complex of higher-education institutions, and the co-educational American University of Sharjah (AUS).⁵⁷ The design of the American University was entrusted to a French architect, Françoise Gambert, and the construction was carried out by the Saudi Binladin (SBL) Group, who also designed the Binladin mosque (north of the Main Building).⁵⁸ The project was completed in less than two years, with the construction carried out in eleven months. The co-educational and private American University has created an influx of a rich, multi-regional student body. It has also attracted international faculty members, many with regional affiliations through experience or origin. This provides an interesting and promising educational base, one that can substantially contribute to quality academic scholarship in the region. The establishment of a school of architecture and design

was a welcome response to the sparsity in architectural academic institutions, both undergraduate and post-graduate, in the UAE and surrounding region.

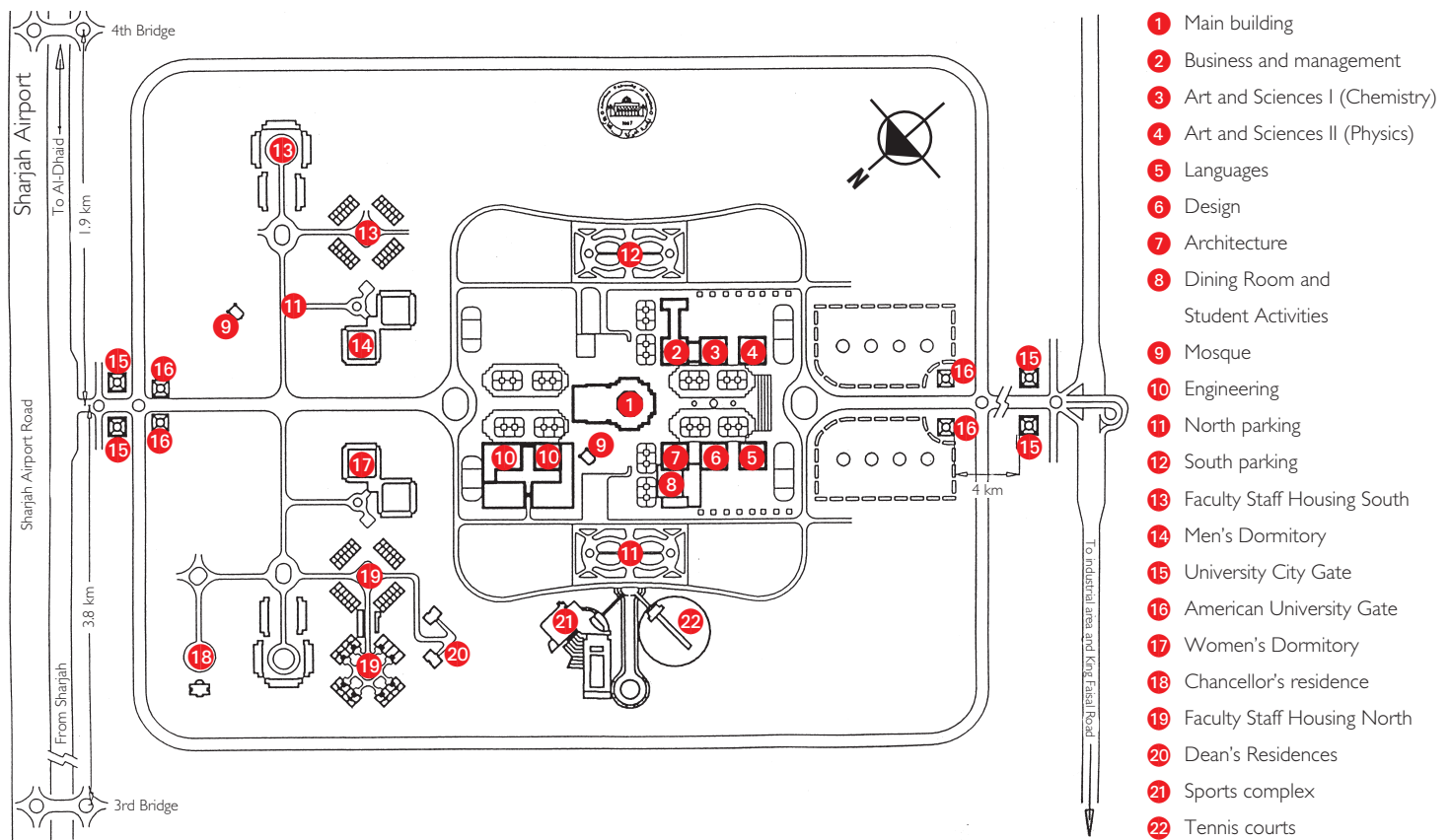
The design follows a grand axis which connects the two city highways (the main Sharjah Airport Road and the Industrial Area Road) via an avenue 100 metres wide and 4.5 kilometres long. A symmetrical plan neatly arranges all the faculty and school buildings along the central axis, and they are set back to accommodate the arcade that opens onto the main court. The main administration building of the AUS is centred on this axis. The approach avenue terminates in a flight of red granite stairs, 75 metres wide, which lead to a raised plaza with neo-classical urns on either side of the balustrade parapet (adding a Versailles touch to the fountain vista).⁵⁹ In addition to the faculty buildings, the campus has separate dormitories for male and female students, faculty housing, residences for the deans and chancellor, a sports complex, tennis courts and parking.

A 'post-Islamic' colonial 'Cairene' style is represented in the main building. Overpowering both in scale

Below

The American University of Sharjah mosque, adjacent to the main building and the faculty building's north-west wing



**Above**

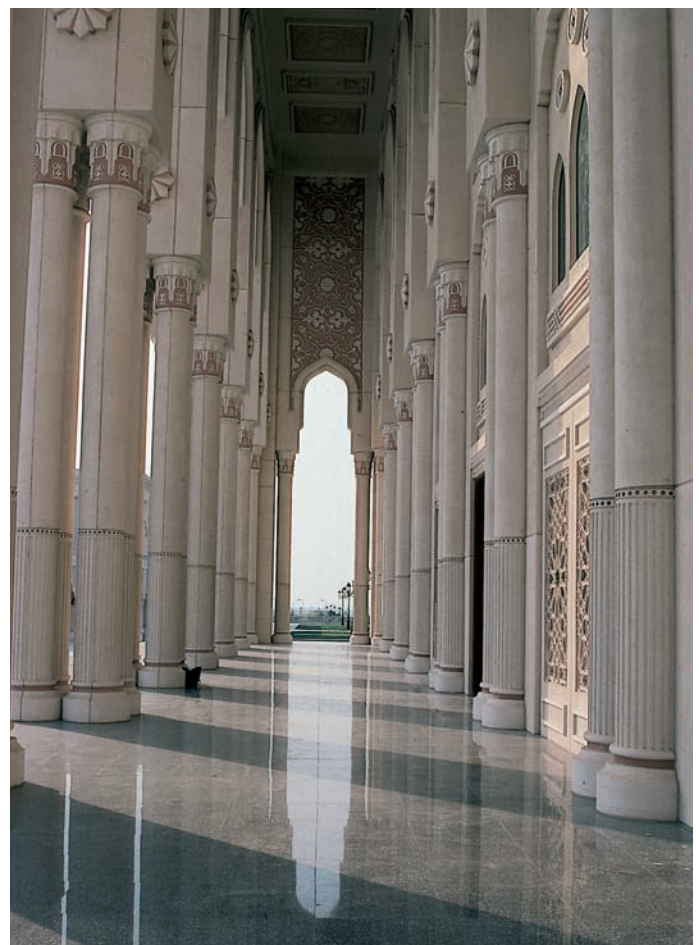
American University of Sharjah: site plan. The site is located between the main Sharjah Airport Road to the north-east and the road leading to the industrial area and King Faisal Road, each manned by the university gates at either end of the approach avenue and main axial spine of the plan. At the centre is the main building

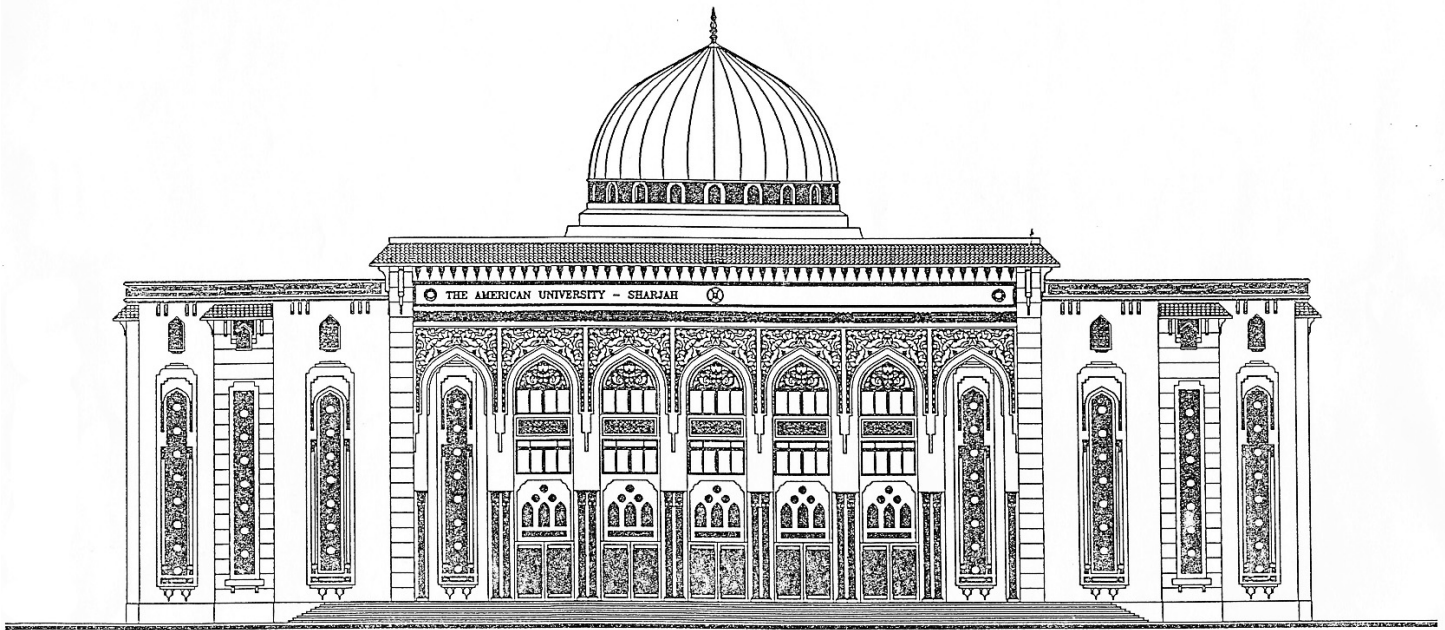
Right

The piazza arcade of the main building, showing the lofty arches and decorative pre-cast elements cladding the columns, arch soffits and ceiling panels

and stature, its dome rises up nearly 40 metres. As an axial 'edifice' crowning the court and faculty buildings, the building has a commanding and impressive presence, and at first glance the planning concept does not appear flawed. The internal space, however, is dominated by unused formal space, asserting an illusion of authority commonly found in court buildings and state institutions. Upon entering the building, a rotunda, octagonal in plan and nearly 35 metres wide, marks the centre of this vast interior space. The diameter of the dome is 15.75 metres and the distance, at ground level, between the columns of the octagon's diameter is 28.88 metres.⁶⁰

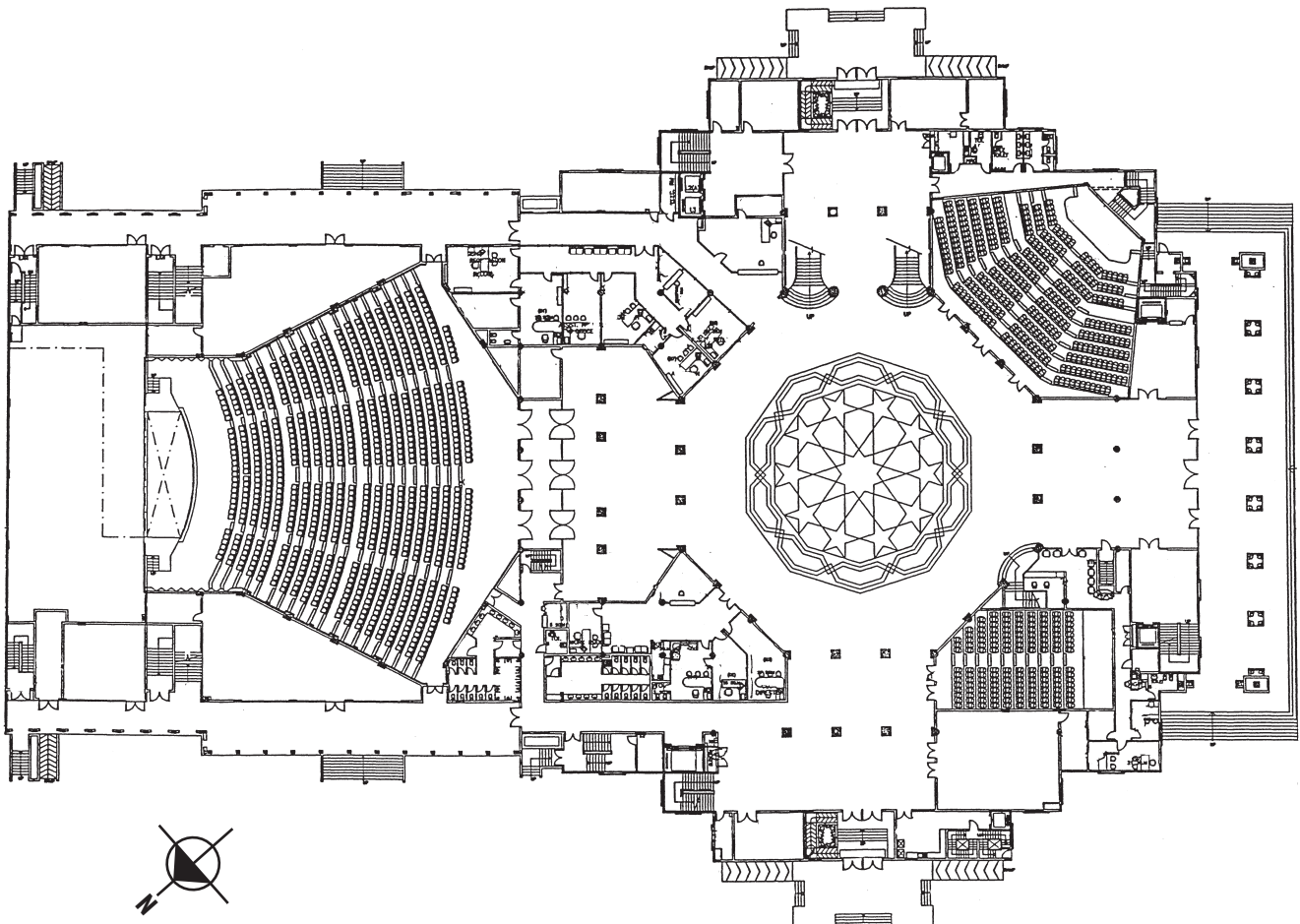
Module panels are repeatedly used in the construction of the arcades and the façades of the two-storey faculty buildings. The standard arcade panel is 4 metres

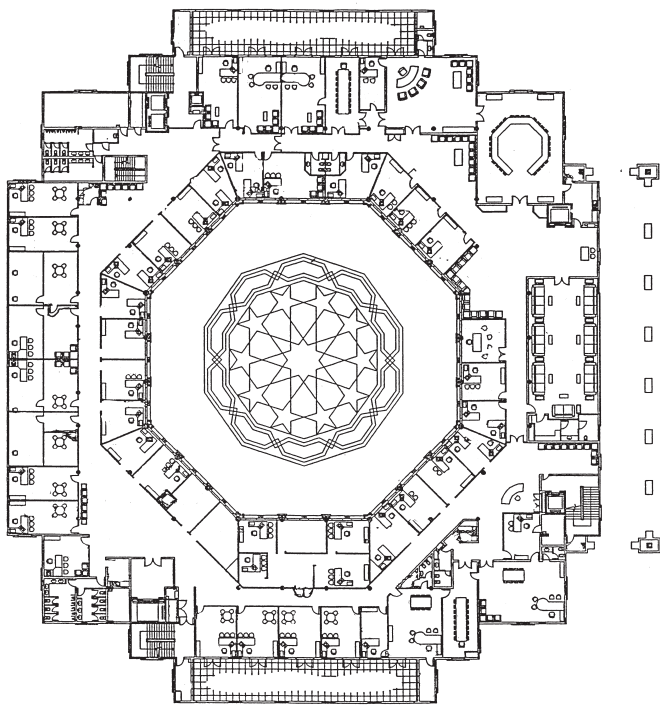




Above
Main building elevation, showing examples of Egyptian neo-colonial and lofty Mughal arches

Below
Main building ground-floor plan showing the central octagonal hall





Top
Main building second-floor plan showing the octagonal void of the atrium space in the centre with the administration and management offices and meeting rooms designed around it

Above
Main building, seen from the open piazza

in width. The wall panels vary in width between 3.2 and 4.22 metres, with a standard height of 5.1 metres. The pre-cast panels, which are finished with buff-coloured sandstone, are typified by applied cornices, border friezes with a relief motif, and twin pointed-arch (gothic) openings framing windows. The entrance to each faculty block leads to a square hall in the centre, around which lecture and meeting halls, and classrooms and offices, are laid out on two floors. A basement floor has labs, studios, storage and other services and facilities. A central dome soars above the hall space, with a window pierced in the drum to provide internal lighting. North African reference (semi-circular arches) is employed in the arcade panels.

The speed with which the building was constructed does not justify a lack of attention to detail and execution,



Right
View of the arcade of the faculty buildings

**Above**

Façade of the School of Architecture, and the Design and Language Faculties on the edge of the piazza

obvious in the poor construction ‘assemblage’ and finish. Pre-cast units and many elements of the buildings (including fitted domes, column shafts, capitals, friezes, screens, arch frames and panels) are blunt in scale and rendering. This is further apparent in the cladding, joints and juncture points. Although an attempt has been made to ‘gentrify’ the building design with a large open court and surrounding landscaped gardens, complete with fountains and running streams, the overall result is flat and obtrusive.

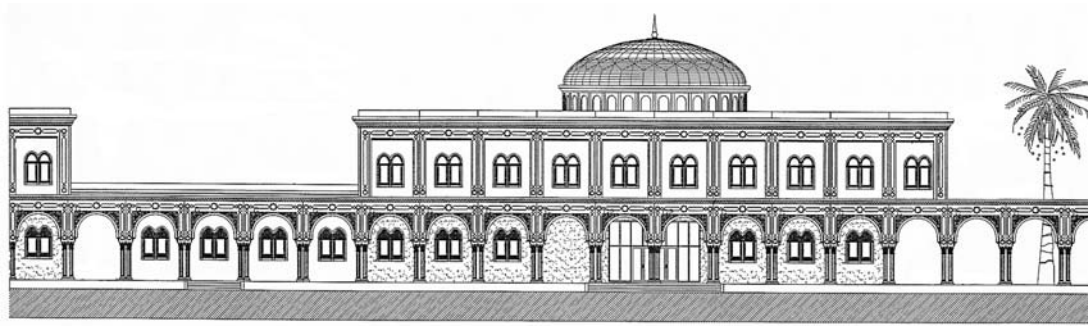
A conflict of interest arises between the expression of the architecture, its cultural representation, and the function of the space. Nowhere is this more clear than in the large open vista of the piazza. A paved court, visually very pleasing, the piazza initially appears to provide a favourable internal campus nucleus. Wide sidewalks and paved areas, together with landscaped courtyards with canals and fountains, all add to the attractiveness of the enclosure and serve to emphasize the exclusive atmosphere of its surrounds. It is therefore deplorable that the sun and glare of Sharjah’s arid desert climate prevent this inviting open-court enclosure from being used during the day. The scant shade provided by the symmetrical arcades lining the court fails to render the court a bearable space

**Above middle**

View of one of the piazza fountains looking across to the faculty wing, running along the north-eastern side

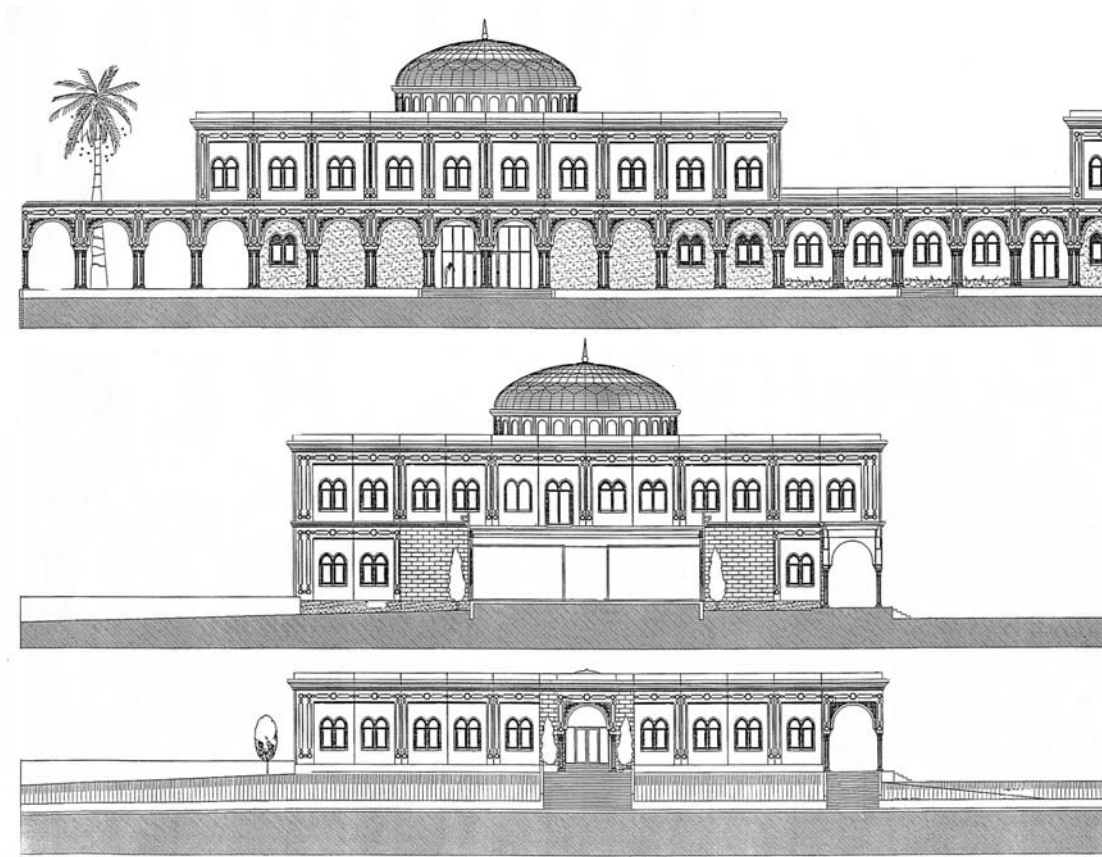
Above

The vast open vista of the piazza looking south-west



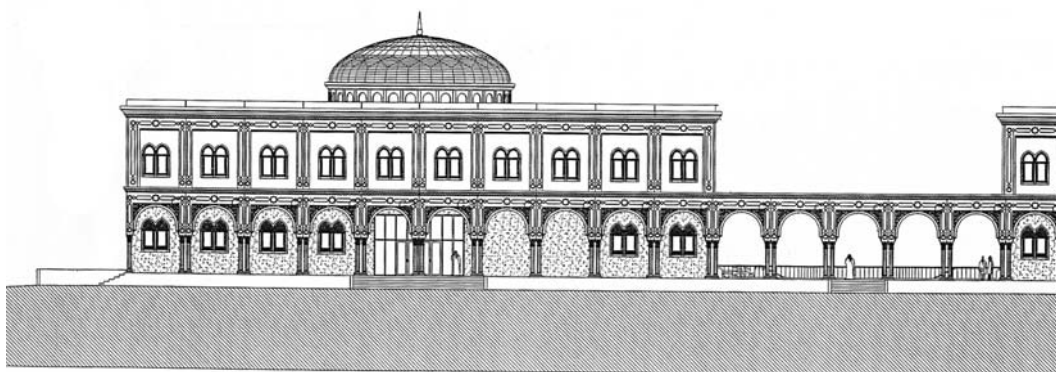
Above

School of Architecture: elevation of the front court. A typical view of the faculty buildings opening onto the main piazza or central court, linked by the raised arcade on the ground floor



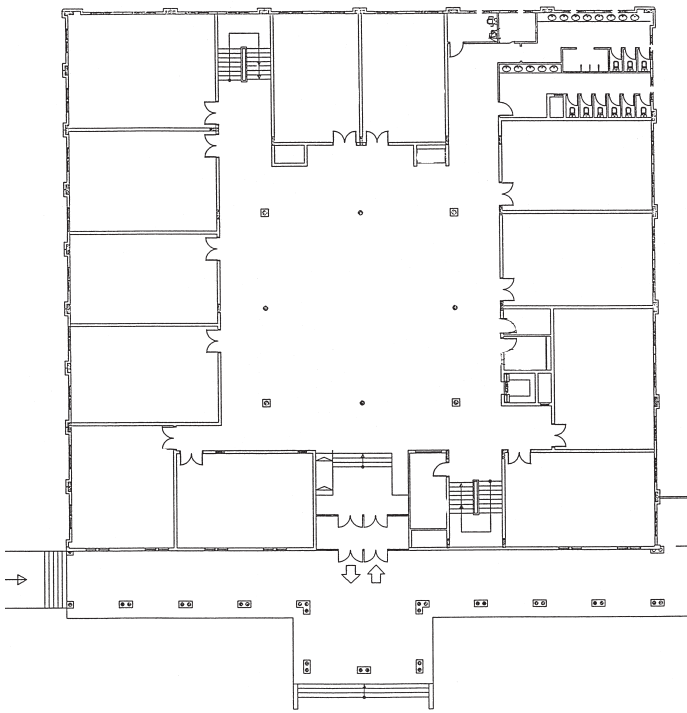
Above

College of Business Management: front and rear elevations, located across the piazza from the School of Architecture

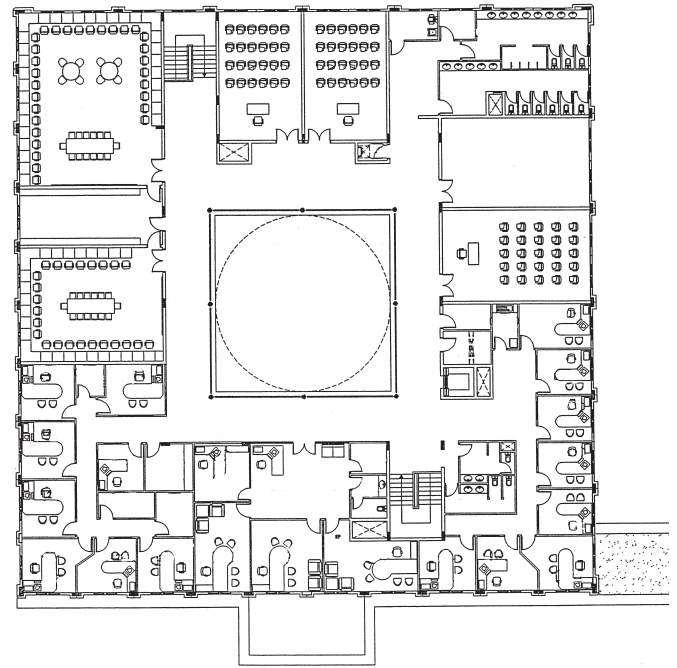


Above

College of Languages: elevation, located at the end of the piazza to the north-east

**Above**

College of Languages: ground floor plan indicating the typical layout of the faculty buildings. The arcade leads to the piazza-facing entrance. A square central hall takes up the full height of the building and is topped with the dome seen in the elevation

**Above**

College of Languages: first floor plan indicating the typical layout of the faculty buildings at this level. Faculty offices, meeting rooms and laboratories are located around the central court opening onto the gallery

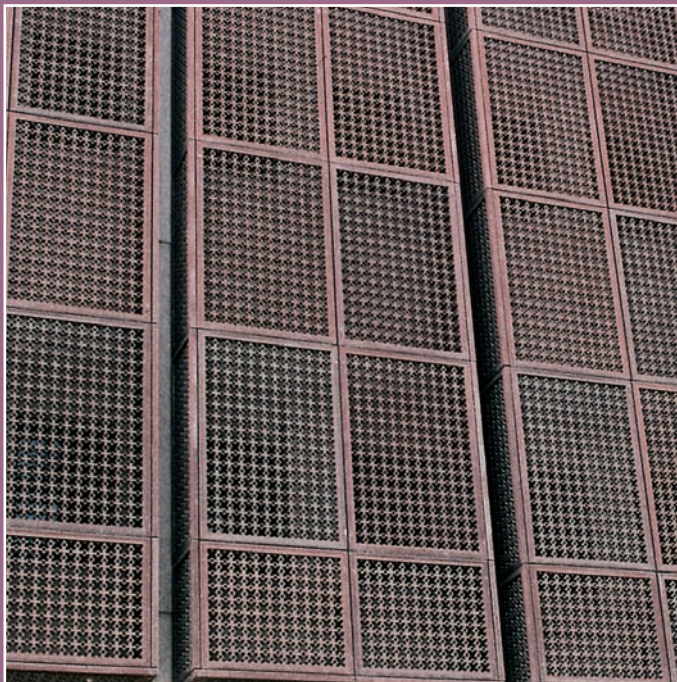
in the heat. Friedrich Ragette, former Chairman of the Department of Architecture at the American University of Beirut, suggests that this obvious, ill-considered design point is intentional, 'since nobody is really expected to use them'⁶¹ in temperature conditions of 45°C – a presumptuous interpretation.

In terms of cultural representation, architects working in Arabia seem to have difficulty with regional architectural references. A classic situation results in a pastiche of 'Islamic' styles recently re-branded as Arab. Therefore little distinction is found between the green fired tiles found in Moroccan and Andalusian vault, dome and roof parapets, and used as a decorative motif of the main building roof, and the lofty Mughal-style arcade front. An article appearing in *The Financial Times* described the campus as 'a grandiose spread of neoclassical Mughal architecture reminiscent of the maharaja's palace at Jodhpur and other monuments from the days of the British-Indian *raj*'.⁶² The result is an Islamic pastiche that borrows heavily from the safe and rigid neoclassical style, with its open vistas and

orderly symmetry, and the neo-colonial model, both Mughal and Egyptian.

Note on AUS drawings

The architectural drawings of the AUS illustrated here are preliminary, and were subject to changes and amendments in the course of constructing the building. They do however give an indication of the design and the overall layout of the plan.



URBANISM AND TOWN PLANNING

Observations on the development
of Abu Dhabi

Nazar Othman Ahmad

Since the production of oil in the mid-1960s and the subsequent establishment of the country in 1971, the United Arab Emirates have been undergoing vast development programmes which have physically changed the shape of the country. This has not only transformed the old oases, market towns and harbours into major cities but has also resulted in the creation of completely new towns and cities. The prime example of this phenomenon is the capital of UAE, the city of Abu Dhabi, which has been developed in less than thirty years from a small harbour and fishing settlement into a major city in the Gulf region.

Based on personal observations, this chapter sets out to describe the physical pattern in which the urban

development has taken place and indicates some of the factors which have influenced the shaping of this pattern. It then presents some of the main features of the city's plan which have determined its physical development. This is followed by a section describing the urban fabric in terms of space creation, scale, continuity, identity and human integration (or the lack of it) in this fabric.

The chapter then describes the dramatic urban renewal that has been taking place for the last decade and looks, in the final section, at where future development is leading.

Building a new city

Unlike new towns which were built as satellites to existing metropolises or new capital cities in an already existing urban hierarchy of settlements, such as Islamabad, Brasilia, Chandigarh etc., Abu Dhabi was conceived and built as the catalyst for an emerging country and as the major centre in a hierarchy of settlements yet to be. As such the city of Abu Dhabi (to be distinguished from the Emirate of Abu Dhabi) was synthesized as a completely new city in a new country.

The image which the first city builders wanted to achieve in Abu Dhabi was that of a totally 'modern' city fit for the technological revolution of the 1960s and beyond, especially the rapid increase in the ownership of motor vehicles. The city was thus conceived physically as a combination of two main elements, namely the major arterial roads crossing each other in a grid-iron pattern and forming between them large super-blocks, and the multi-storey buildings which filled these super-blocks.

The model for this was possibly the island of Manhattan and the objective was to create, in a very short period of time, a convincing resemblance in physical terms of a highly urbanized settlement.

The term ‘urbanization’ is often used in planning terminology and its Arab equivalent is *taḥaddur*, a derivative of *ḥaḍārah* which means civilization. In other words urbanization is synonymous with civilization and civilization in this respect is the creation of a ‘modern’ image.

This image was endorsed through the creation of high-rise buildings as a sure sign of city development and as a physical sign of progress. It is necessary to understand the psychology underlying the interpretation of progress. Modern architecture and town planning, in international terms, brought the possibility of vertical expansion coupled with commercial speculation. Large-scale development became impressive, especially in societies where small-scale low-rise low-density living is common. In order to emphasize that a city is progressive it was felt essential that high-rise development should be its backbone.

One should also consider the effect of the actual demand generated by the expatriate population which was attracted to working and living in Abu Dhabi as a result of economic growth. The primary economic sector that attracted employment was oil extraction, transportation and marketing. This generated further employment in the construction and service sectors which in turn generated additional multiplier effects. All of this attracted a workforce from various parts of the world. Most of those who came were either single people or had small young families. The trend was therefore to live in small flats. Most of the expatriates who might originally have come on short- to medium-term contracts and who probably only planned to stay on temporary or transient bases felt that living in flats was much more convenient than living in houses, not that houses were readily available anyway. This was also influenced by the fact that a lot of the expatriate population came from cities where living in a flat was common practice.

Another factor which encouraged high-rise development was the desire of landowners to maximize return on

land given to them by the State. Since financing was facilitated on easy terms, originally from the commercial banks and later from the Department of Social Services and Commercial Buildings (DSSCB), owners were keen to maximize the utilization of land with vertical expansion. Usually high-rise development is appropriate for the provision of office space, but since the demand for office space was limited, the nature of development in general led to the creation of residential flats which could also be used as offices, clinics and the like. This led to a first generation of multi-storey buildings that were totally mixed in the way they were utilized. It is still very common to have a residential flat next to a doctor’s or dentist’s clinic or an architect’s or a lawyer’s office. In other instances it is not uncommon to find large polyclinics or Government departments occupying several floors of an apartment block. As a result residents, professionals and patients have to share their stairs, lifts and lobbies with each other.

The development of Abu Dhabi was also influenced by landowners’ desire to reflect a certain status and individuality in the city. Competition for erecting the ‘unusual’ and possibly the ‘higher’ followed, with an interest in establishing with each different building a monumental statement.

This choice, which was a result of the availability of varied construction and finishing materials, technology, design capabilities and the like which hitherto were very limited or not even available, encouraged landowners to ask for fancy buildings, different in look from the surrounding buildings, so as to stand out in form, colour, style, finishes and so on.

Features of the city plan

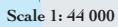


Panoramic view of Abu Dhabi Island looking towards the Corniche Road, where the results of the commercial investment in recent construction is on show. In the foreground is the Baynunah Tower, adjacent to the separate British Embassy compound, secluded amidst gardens and low-rise red-roofed tiled buildings.

The city of Abu Dhabi is built on a triangular island which is connected at its narrow tip to the mainland by two bridges, one of which, Al Maqta' bridge, was recently doubled by building a duplicate one next to it. The island was first settled around 1795 when Shaykh Shakhbūt bin Diyāb of the Āl Bū Falāḥ tribe, the ruler of the Banī Yās tribal federation, made it the seat of his federation and moved there from the mainland. The main reason for moving to settle on the island was to achieve sufficient security and protection from other tribes and this was made possible by its natural harbour and the existence of fresh water on its shores. Fishing and pearl diving flourished with the associated boat building and trading activities. This small settlement remained without any significant development until the mid-1960s when HH Shaykh Zayed Bin Sultan Al Nahyan came to

power and started the modern development of Abu Dhabi as the capital city of the Emirate of Abu Dhabi. Later (in 1971) it became the capital of the UAE, thus maintaining the historic importance of the island. This was augmented by the traditional sense of security and protection, the maximization of the seafront development and the romantic notion of being surrounded by the sea, where traditionally two of the main economic activities took place, namely pearl diving and fishing.

The city was designed as a grid-iron system with main longitudinal arterial roads running along the length of the island and others of equal importance cutting across its width. The areas enclosed by these main roads form the super-blocks within which urban development has been taking place. Generally speaking, high-rise developments of up to twenty storeys (commonly



**Above left**

Towering 1990s buildings. Curtain wall glass-clad façades rise along the main corniche and line the main roads of Abu Dhabi

Above right

New generation buildings combining commercial and residential use. Recently completed and a product of the intense reconstruction of the 1990s, these buildings compete in the urban landscape with different interpretations and the new identity with styles that can be loosely placed as an echo of high-modern or post-modern architecture



high- to medium-rise buildings. This occurs along parts of Shaykh Rashid Āl Maktūm Street (also known as Airport Road) and the super-blocks between Falah and Haza'a Streets.

A few larger blocks are occupied by low- to medium-rise public buildings spread over generous areas. (Examples of these are the Municipality and Planning complex, Jazira, Central and Shaykh Khalifah Hospitals and the Cultural Foundation.) Furthermore some of the super-blocks are utilized primarily for open landscaped areas and park land such as Asima Gardens, Corniche Gardens, Khaldeya Park, Nasr Gardens and Bateen Airport Park. In addition to these open landscaped areas the sea edge on Corniche Street is also landscaped, varying in width between 10 and 100 metres. Most of the main arterial roads have generous central reservations which are planted. Some of these reservations are quite substantial, forming linear gardens. This is particularly so at parts of the Airport Road, Mina' Road, Corniche Road, Baynūnah Street, Shaykh Zayed the First Street, East Road, Murrūr Road and the new Eastern Corniche Road. A major recreation area is to be found at the north-western end of the Island, called Rās Al Akhḍar. This, along with

known as towers) are strung along the perimeters of the super-blocks while the inner parts are occupied mainly by lower-rise buildings of up to seven storeys. In areas nearer to the Corniche Road, the inner parts are also formed of high-rise buildings. This is particularly so in the areas between Ḥamdān and Khalifah Streets, between Khalifah and Corniche Streets, between Baniyas and Salām Streets and in some parts of the Tourist Club district. These areas therefore form the highest urban density in the city. In another extreme, the land use is allocated totally for low-rise residential villas towards the south-eastern part of the city. A mixture of the two forms also exists, whereby the inner part of the super-block is mainly of low-rise villas while the perimeters are

A set of high-rise blocks combining residential and commercial use adjacent to the Etisalat building across from the Cultural Foundation on Shaykh Zayed II Street. The lower buildings are the product of the first period of construction that took place during the 1970s and early 1980s



the Breakwater is formed from a large area of reclaimed land turned into parks, beaches, sports and recreational facilities and a large shopping complex, the Marina Mall. Recently part of this area has been allocated for a major conference centre and related facilities which are currently under construction. Nearby Lulu Island, a substantial area, extends all the way to the northern end opposite the Corniche Road and is being developed for recreational use.

Most of the federal government ministries, a few major oil companies' headquarters and two main hotels are concentrated at the western corner of the city nearer to the Corniche. Other main hotels and oil company headquarters are located at the northern corner of the city. Major sports stadia and facilities are located further to the south-east while commercial activities are spread all over the city but concentrated in the north-western part and along the Shaykh Rāshid Āl Maktūm Street.

Except for some limited industrial facilities in the Port Zāyid area and small repair shops scattered in various parts of the city, no industrial activities are found within the Island. The majority of these activities are located on the mainland opposite the southern tip of the Island in the Muṣṣaffaḥ area. This area contains activities related to light industries, repair industries, storage facilities and the like. Recently, multi-storey, low-rise residential buildings have also been developed in this area. Muṣṣaffaḥ also contains a small port and a dry dock; however, the main port of Abu Dhabi is Mīnā' Zāyid which is located in the northern tip of the Island. In addition to the normal port facilities, the area of the port contains substantial, privately owned storage facilities

as well as wholesale markets for fruit, vegetables and fish. It also contains some industrial plants.

The transportation system is based on road transport with a mixture of privately owned vehicles, taxis, company/school and Municipality buses. Generally speaking, all arterial roads have secondary service roads running parallel at either side. These normally contain car parking spaces. A very limited amount of underground parking has been provided in recent years, as part of high-rise buildings. The Municipality has recently completed a few large underground car parking facilities for public use in the high density parts of the city. Roads and at-grade car parking are also provided within the inner parts of the super-blocks.

As mentioned earlier, the Island is connected to the mainland and subsequently to the other cities and towns by two bridges. The first is Al Maqṭa' Bridge and its recent twin which connect with the Shaykh Rāshid Āl Maktūm Street and the recently completed Eastern Corniche Road. Shaykh Rāshid Āl Maktūm Street cuts across the length of the city meeting the Corniche Road at approximately its midpoint, while the Eastern Corniche Road (which becomes Salām Street later) circles the city from its eastern perimeter. The second bridge, al Muṣaffaḥ Bridge, is connected to the Arabian Gulf Road which stretches the total length of the Island until it meets the Corniche Road at the western corner of the Island. The site of Al Baṭīn Airport (the old international airport), which occupies a large portion of the south-eastern tip of the Island near Al Maqṭa' Bridge, has been allocated for major recreational use, Shaykh Khalifah Public Park, which is now being developed.

The urban fabric

The spread of the city centre

In a naturally evolving city, its centre will grow from a nucleus of physical entities which accommodate civic and public functions, trade, entertainment and related services. These entities, which are formed of buildings, spaces and thoroughfares, become the hub of the city's activities and define a centre. One of the shortcomings of Abu Dhabi's urban fabric is the lack of a defined city centre. A city centre, as an urban and a functional core, cannot be identified amongst the multitude of wide criss-crossing roads fashioned after the grid-iron plan.

The one building which could have acted as a focal point for the growth of the city centre is Al Ḥuṣn Palace, built by Shaykh Shakhbūt Bin Diyāb when he first settled on the Island around 1795. The fortress was, up until the mid-1960s, the only major structure of any significance that stood in the Island and was also used as the residence of the ruling family. Although it has successfully been converted into a museum, grouped with a building of architectural merit housing the Cultural Foundation, it is treated as a separate monument rather than as an integral part of the city. The area where it stands together with the Cultural Foundation is now fenced and surrounded by major city roads. The complex of Al Ḥuṣn Palace and the Cultural Foundation with their mix of civic, cultural and entertainment functions could have created a focal point and a major public place to attract people to walk through it to other parts of the city; in this way it could be used to link between the components of the city centre. Instead it is now a place that is mostly visited for particular cultural events and this must be done by car to penetrate the traffic of the surrounding roads.

Other opportunities to create a city centre in association with new civic buildings, such as the Municipality and Town Planning complex, federal government offices and ministries, National Assembly building, law courts etc, were not seized. The majority of these buildings are located on the edge of the central area

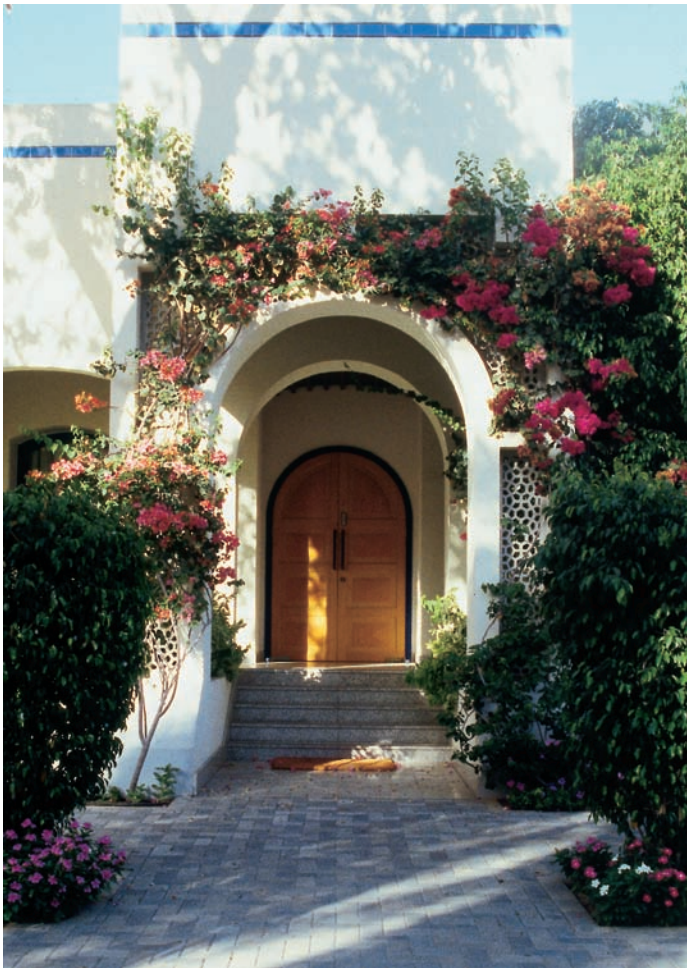


Above

View of Al Ḥuṣn Palace in the foreground with the Cultural Foundation housing the national library and an exhibition hall in the background

and are not designed to be integrated into the urban fabric, but as individual functional buildings.

Consequently, the central activities in Abu Dhabi became spread along the main streets with equal concentration and intensity. This effect was emphasized by the grid-iron division of the city which gave equal physical emphasis to all parts of the city without giving hierarchies of central place. Notwithstanding the quality of architecture, the urban fabric throughout the high-rise north-eastern end of the city has the same repetitive characteristics without a real identity between



**Above**

Aerial view of the British Embassy grounds, located on the Abu Dhabi corniche. Along with the Ḥuṣn, this is the only remaining low-rise compound of the early era of Abu Dhabi. An idyllic enclave, reminiscent of the British Middle Eastern colonial environment, it provides a calm and valuable contrast, and an element of surprise, amongst the gloss of the surrounding urban fabric of high-investment property. The enclosure, despite the plain and old-fashioned quasi-colonial architecture, asserts a focal point of relief in the town plan. The compound contains the Chancery building, the Commercial Section, the Ambassador's Residence and housing for the Embassy staff members. The landscaped gardens and grounds lead to tennis courts and a swimming pool

Opposite page**Top**

Close-up of the reconstructed Al Ḥuṣn Palace, at the Ḥuṣn Street entrance

Bottom left

The Commercial Section building of the British Embassy

Bottom right

Close-up of the entrance to the Chancery, British Embassy

one street or another or between various major intersections. Thus the whole of the high-rise portion of the city acts as a loosely spread centre.

Coupled with the above, there is no distinction in the land-use mix between residential and commercial activities in the high-rise part of the city. As mentioned earlier, residential, commercial, office, entertainment etc. are all mixed together in the same area and the same building. This phenomenon has prevented the feel of a central business district (CBD) which is normally the hub of the city centre and is usually focused on office and commercial activities. Only very few multi-storey buildings are totally designated for office use. The majority are residential buildings designed as apartments, part of which may be rented as offices. Although this does have the advantage that most of the areas are lived in, so there will not be dead areas at night, one still feels that the mixture is so haphazard that an essential component of the CBD has been sacrificed.

In this context it ought to be noted that the spatial morphology of the city does not have the sequence of spaces, routes, walkways, meeting points and the like which are common in a city centre and which give the interest of moving and walking within an urban centre and experiencing varying spaces such as courts, squares, *sūqs* and cafes. Here the city has been planned primarily for vehicular movement which unfortunately has sacrificed the intimate relationship between man and town. This is especially so as the scale of the major roads dissecting the city is so vast and unrelated to human scale. Although the extreme heat and humidity of the summer season may not on the face of it encourage the concept of walking in sequential spaces, this could be resolved with a more considerate urban design. The fact that nearly half the year offers ideal weather for walking and sitting outside justifies the creation of pedestrian squares and courts.

The problem of identity

The other feature of the urban fabric is its lack of identity. As mentioned earlier the majority of roads have the same characteristics of being wide, linear and having a continuous string of high-rise buildings on either side. Even the road intersections look alike with roughly similar high-rise buildings surrounding them. Unless one is well acquainted with the city, it can be difficult sometimes to identify a particular street or intersection.

Lack of identity is also a result of the similarity of plot subdivisions and the physical form of buildings, for although they may reflect a variety of architectural façade design, as a whole they represent a more or less similar massing treatment which has resulted in the formation of multi-storey pillars stretching from one road intersection to another.

The desire of the individual citizen to own his piece of land and to build a multi-storey building which he can identify with, along with the wish of the State to satisfy this desire, have led to the subdivision of land into a maximum number of individual plots for distribution amongst national citizens. To generate a maximum number of plots, it was necessary to minimize the size. It was also necessary to leave small gaps between plots. The result is endless small plots individually parcelled,

varying in size between 16.4 x 24.4 metres and 30.5 x 30.5 metres in general, with some smaller and other larger plots. The gap between plots can be as small as three metres. As can be appreciated, the development of small multi-storey buildings on these plots has resulted in the creation of individual entities towering next to each other with little connection between them to integrate them together. Each building is too small, in plan, to be appreciated on its own as a distinguished component of the fabric, and they are different in style and too separate from each other to be read as part of a whole. One can equate this situation with a fabric that is running in a vertical dimension without due attention to the horizontal dimension, thus leaving it disjointed.

It is clear therefore that the demand to individualize land and building ownership has had a major effect on the urban fabric. Since all the land is given to individuals by the State and since the State finances the construction of the majority of the commercial/residential buildings, one could pose a question as to why the ownership of land and the subsequent buildings was not made in a collective form. It is felt that this would have gone against the nature of people and the preference for exclusive property ownership. A comprehensive development of a super-block as an urban design entity would have created, if well designed, interesting physical solutions. However this would not have satisfied the social criteria. It is therefore an enigma for the planners as to where to place the emphasis and strike a pattern that can satisfy both criteria. Obviously the social criteria outweighed the physical ones.

Urban spaces

The provisions for car parking and vehicular movement have had a much more prominent priority in the formation of urban spaces than human movement and interaction. No squares or courts can be identified as urban places within the centre. Landscaped spaces within the city are parts of the central reservations of major roads and, though they form a visual relief, they are not easily accessible places for public use. In the evenings, at weekends and on public holidays one often sees groups of expatriate labourers gathered in car parks and on street corners for lack of formal open spaces.

Similarly, urban spaces within the high-density central area (inside the super-blocks) are limited to streets and car parking areas which are formed between rows of multi-storey buildings. As the central area contains most of the city's expatriate residential population with young children, the absence of recreational facilities has led to the use of car parking lots as playgrounds and gathering places and for ball games.

The linearity of the town form

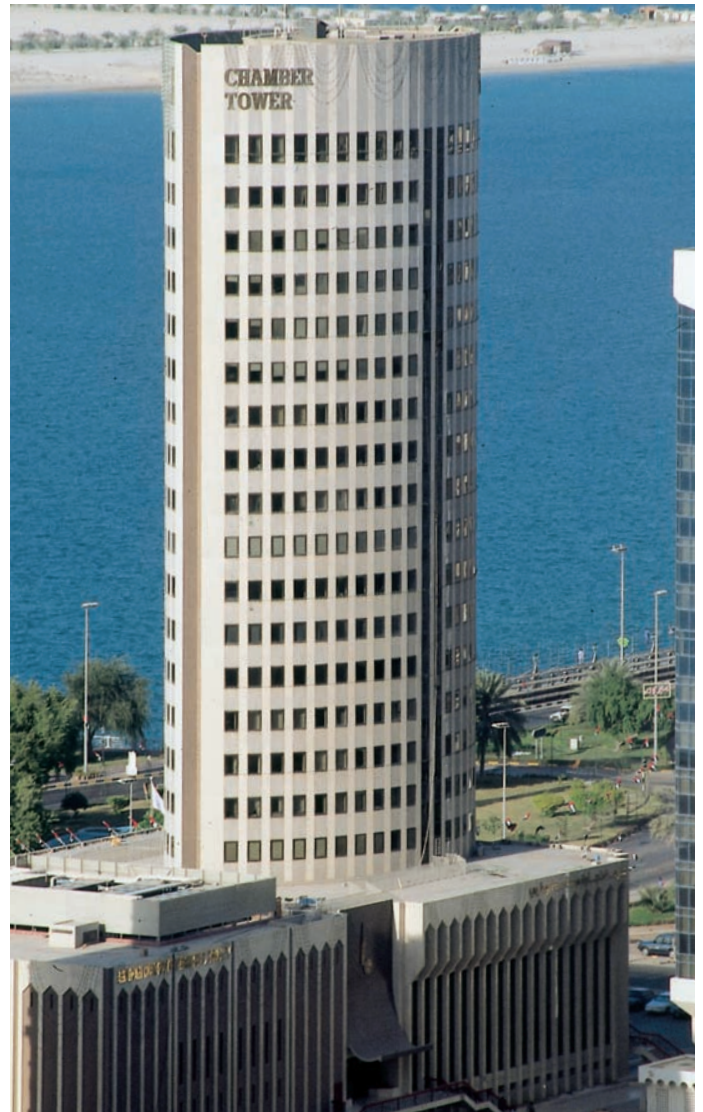
Being built in a grid-iron plan the city has a distinct linear form. Most major roads stretch in a straight line from one end to the other without a bend or a curve. With one or two minor exceptions, all the streets are perpendicular or parallel to each other. One can stand at one end of a major road such as Shaykh Rāshid Āl Maktūm Street, Ḥamdān Street or Zayed the second Street and see the road and the buildings on either side in a perspective that stretches endlessly on a straight line. The lack of spontaneity and directional changes can result in a somewhat rigid and blank form. It is difficult to assess the objective of the early planners who implemented this design on an empty island, in such a rigid way, except that it was influenced by a vision of modernity and functionalism.

Road network

Originally, all major roads intersected in roundabouts. As car ownership increased, these were no longer sufficient to cope with the traffic movements. Eventually, all the intersections were changed to signal-controlled ones. In addition a tunnel was built at the intersection of Shaykh Rashid Āl Maktūm and Zayed the second Streets, as well as a few flyovers. Although signal-controlled intersections have resolved traffic congestion to a certain extent, especially along such roads as Shaykh Rāshid Āl Maktūm Street, bottlenecks are still forming during rush hours in many of the central streets. This is expected to become more acute as the population in the centre increases with the super-blocks becoming filled with more and higher-rise buildings. As the traffic generation and attraction of these blocks are increasing, intersections will gradually cease to be capable of absorbing the traffic flow smoothly.

Quality of the built environment

Two groups of buildings can be distinguished in Abu Dhabi – each has its own characteristics and they need to be discussed separately. The first is the multi-storey commercial/residential buildings which fill the majority of the urban space, while the second includes much larger and more prominent office and headquarter buildings for major corporate entities such as oil and telecommunication companies, hotels and some civic buildings. The quality of the built environment is the collective result of these buildings and their integration with surrounding spaces and other physical entities.



Above

The Chamber of Commerce and Industry Tower, located in one of the favourable spots on the corniche sea-front strip. Kurokawa's design for an annex features an adjacent slim rectangular building that towers well above the rest of the building, to emphasize its central function (Kisho Kurokawa, Tokyo, 1996)



The architecture of the commercial/residential buildings has in most instances taken an experimental form. The lack of historical reference of architectural quality coupled with the desire for the expression of individuality by property owners have led to architectural treatments which in most cases are over decorated and lacking harmony, scale and proportion. Images of local and regional heritage such as the arch have dominated architectural treatment and elevational solutions. The availability of different construction and finishing materials has opened up experimentation and has in many instances resulted in an excessive use of varying finishing materials either on the same elevation or on buildings very close to each other. Architects from different backgrounds and with different training have been working in the city with different understandings of aesthetics and varying approaches to design discipline and architectural philosophy. The bye-laws governing heights, projections, set backs, fenestrations etc. have largely influenced the form of these buildings. In addition, the statutory

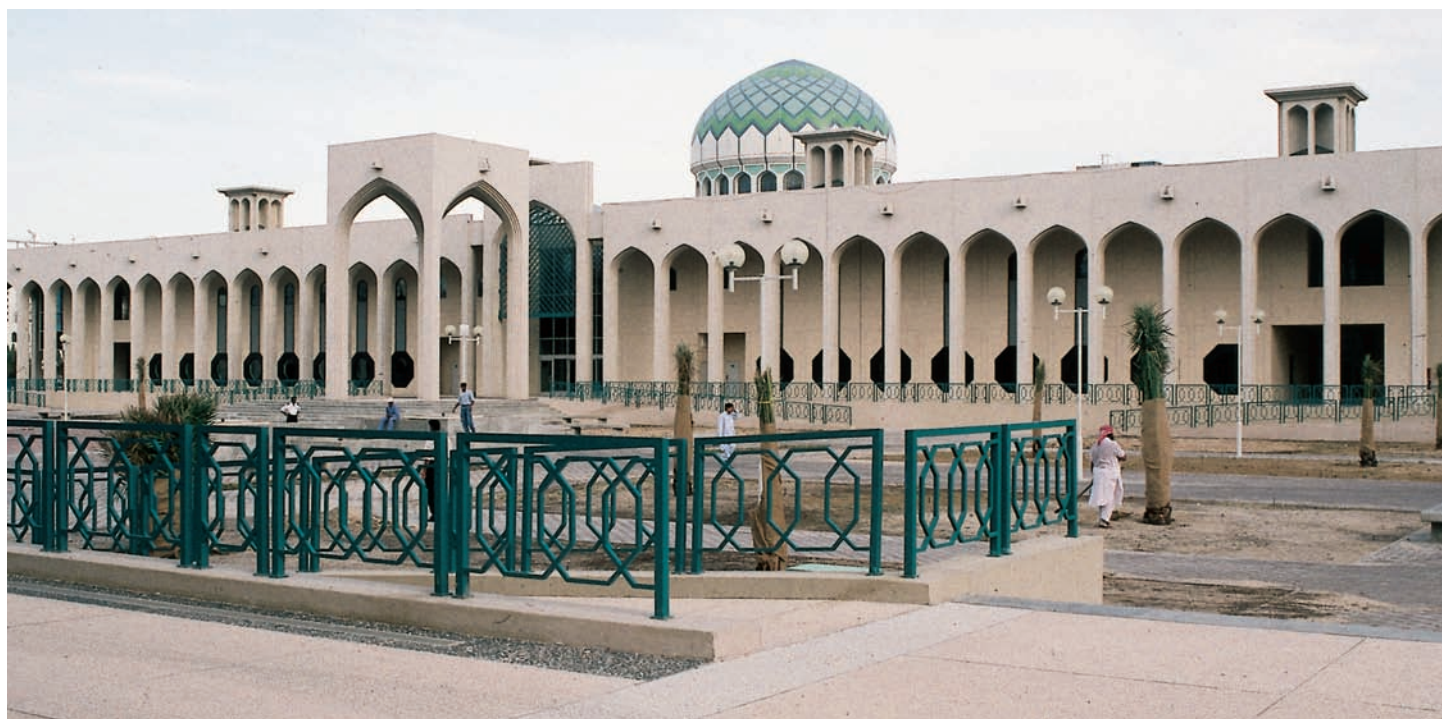
Above

Close-up of a cluster of high-modern buildings in Abu Dhabi, some of which subscribe to the stereotypically Arab or Islamic 'arch' style; the view also shows a modified corner squinch, a feature of the Arkan building on the right

Below

Detail from the mashrabiyyah screens used on the façade of the Central Post Office





Above

The recently constructed Central Market, known as Zayed's Shopping City, which employs Arab/Islamic references as typified by the dome, arches and windtowers

Below and following page

Detail of a commercial building, clad in pink marble and reflective glass with a squinch type of interplay running from the ground-level corner edge (Arkan, 1997)



requirements to produce elevations of an 'Arab/Islamic' caché have led to the forceful inclusion of features such as arches or decorative elements that have, in many cases, had adverse effects on the quality of the elevations. This is particularly so in the second generation buildings when town-planning regulations allowed for higher-rise buildings and more funds became available allowing the use of more diverse cladding materials such as glass curtain walling, granite and marble, ceramic tiles, GRC, self-finished pre-cast concrete, aluminium panels and the like. Although these materials were used previously, they were used in a limited way and were mainly imported. With the establishment of aluminium extrusion and fabrication factories, GRC and pre-cast concrete factories, and marble and granite cutting and polishing factories, these materials became more readily available and more fashionable to use. Plot owners' individuality had to be reflected not only in the architectural style but also in materials, colours, type of glazing, motifs and features used.

These features also reflected their taste in architectural style which in most cases represented a simplistic understanding of heritage, modernity, regionalism and internationalism. This, coupled with the haphazard experimental nature of the architectural profession that





Top
The Central Post Office



Above
Fuchsia metal panelling and
reflective glass characteristic of
recent vibrant tower cladding

mushroomed, produced some exaggerated examples of architectural interpretation. Gold-coloured glass and aluminium represented richness, while blue glass matched the sky and green glass reflected the green landscape. Rose, pink and maroon glass and aluminium were also used to stand out. Some tasteful and subtle

examples can of course be found, but the majority tend to be garish.

Features of traditional architecture such as the arch, columns, capitals and lattice-work are also used extensively and in a multitude of forms, details, scales and sizes. Other features such as windtowers and desert forts have also been used to reflect regionalism but only as superficial decorative features and applications.

As these buildings are so close to each other occupying a relatively small site, a clash of styles, features, materials and colours has resulted without sufficient space or vista to digest each separately.

In contrast to the first group of residential/commercial buildings, the second group have a distinctly higher architectural quality in terms of design, detailing and finishing. This group is represented by such buildings as the headquarters for oil companies (ADMAOPCO/ZADCO, GASCO/ADGAS), headquarters of the Telecommunication Corporation (Etisalat), civic centres such as the Cultural Foundation, and hotels such as the Abu Dhabi Grand and the Intercontinental Hotel.

The majority of buildings in this group are built on much larger plots than the ones described in the first group, allowing the designer sufficient flexibility of layout, massing and the creation of form. The other advantage is that large international architectural outfits are normally engaged on the design of these buildings and can therefore demand full professional fees for the design and supervision to enable them to spend the required time and effort to produce a quality building. In addition the cost of construction per unit rate is normally much higher and could be more than three times that allowed for in the first group, which obviously results in a much better quality of construction and finishes.

Generally speaking therefore, this second group of buildings tend to be of much larger scale than the first, their design is more streamlined and they make an impressive architectural statement. They are also distinguished in the sense that each stands as a separate work surrounded by generous space and can be appreciated individually.



Close-ups of the ground and upper storeys of the Abu Dhabi Marine Operating Company headquarters (Jung/Brannen, Boston, USA, 1996). The building design involved Nader Ardalan who refers to the interior garden enclosure as a 'garden paradise'

Urban renewal

Considering that 35 years ago the city was being built almost from scratch and then 15 years later the urban stock of buildings and infrastructure went into a process of total renewal, it can be said that in the past 3.5 decades the city has been built twice over. Only a small percentage of the first-generation buildings remain standing; the rest have been completely renewed. Even the few remaining first-generation buildings are expected to be replaced in the near future.

This phenomenal renewal of the city fabric has also included the reconstruction and upgrading of roads, sewerage, electricity, water supply and the communication networks. The renewal and upgrading has been a continuous and gradual process for the last 20 years.

The first generation of buildings in the central part of the city which were started in the late 1960s were mostly 8 to 12 storeys high. They were built with speed to accommodate the influx of the expatriate workforce that was being attracted to the new work opportunities generated by the rapid growth of wealth and economic activities. Limited concern was then given to detailing, construction materials and techniques, servicing and environmental control. Furthermore, construction

know-how and supervision were all new commodities imported from abroad. The resultant buildings were therefore of mediocre quality but it created the city as a physical entity and satisfied the immediate demand.

With the lack of sufficient building maintenance, and a heavy turnover of tenants as a natural result of the transient nature of the expatriate population, these buildings needed to be replaced. In the ten years or so since construction the return of investment of the majority had been paid back, which provided more reason to knock the buildings down and utilize the scarce land for a more dense occupation with higher buildings.

The renewal of the building stock is associated with the changing of the planning bye-laws which allowed the building of higher-rise buildings than previously was acceptable. This change came about to satisfy the increasing demand for apartments and offices and the desire to utilize the limited amount of land in a denser way. This was coupled with the wish to give Abu Dhabi an increasingly modern image and with the availability of funds, which the Government wished to pump into the construction sector to keep this vital economic sector rolling.

The first-generation buildings were thus demolished one by one and new, much higher buildings were built in their place. At times, and depending on the availability of land, some of the building plots were increased in size by a few metres in each direction, while neighbouring plots belonging to the same family were merged together to create one super-plot.

The relative increase of awareness of quality and the availability of funds demanded better-quality construction. This affected the construction industry as a whole in that contracting companies started to grow larger and to consolidate themselves for bigger projects, and manufacturing companies had bigger markets for their products and thus became able to expand and improve them. This meant suppliers could modernize their trade and keep abreast with the most up-to-date products manufactured throughout the world.



Above
The demolition of an early-modern building in order that it be replaced by a high-modern and post-modern tower, Hamdān Street



Above
Example of the earlier generation of buildings on Hamdān Street, many of which have since been pulled down to make room for new high- or post-modern multi-storey buildings

On the other hand, as urban renewal continued rapidly and as the construction industry grew, more demand was generated for designers, contractors, suppliers and the like. This expansion was not always free of faults. Many small-time contractors started bidding for much larger jobs than they were capable of handling, and many new contracting outfits were established without sufficient financial or technical back-up, hoping to get a share of the growing market. On the design side, numerous offices sprang up, again some of them without sufficient experience, thus affecting the quality of the resulting work. The same can be said about new untried products that were marketed taking advantage of the desire for better-quality and more durable buildings. Here again some products proved not to be particularly suitable for this part of the world or the type of construction techniques needed here.

The renewal inside the super-blocks saw a change in the building form from the first-generation low-cost one- and two-storey housing into medium-rise (up to seven-storey) apartment buildings. The entire building stock in the inner super-blocks has now been renewed in this fashion. As a result accommodation densities within these areas have multiplied several-fold. This renewal is

coupled with completely new road and infrastructure networks. The layout of this new development inside the super-blocks is also based on a grid-iron of roads and rows of buildings. No attempt was made to utilize the opportunity of changing the development form and land-use mix to create more interesting planning layouts.

Urban renewal in most parts of town has caused physical congestion of building masses as much taller buildings are built too close in front of and next to each other. In some cases this congestion is acute and oppressive.

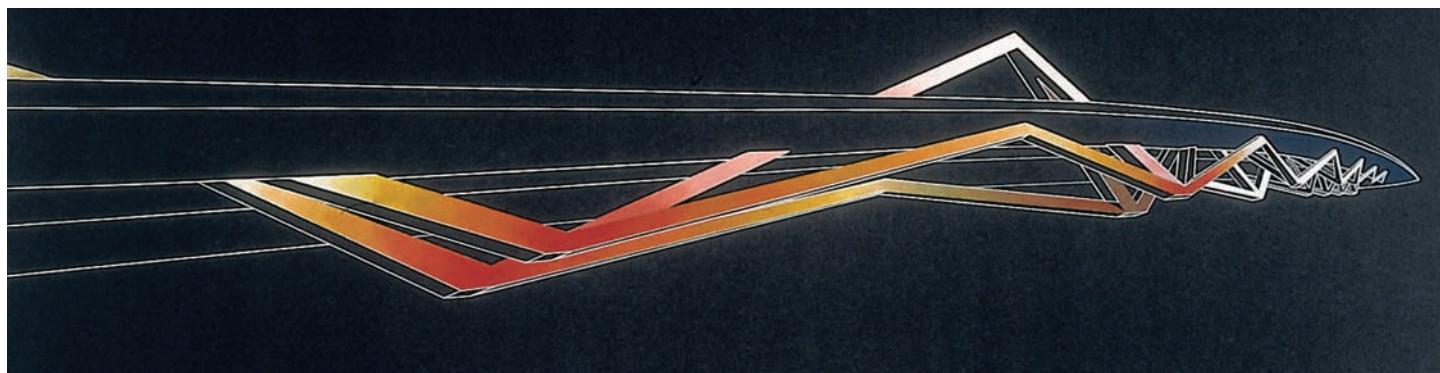
Oil companies and quasi-government companies (such as Etisalat and the Abu Dhabi National Hotel Company) have also contributed to the urban renewal by constructing major buildings either as headquarters, residential expansions or hotel renewals and extensions. As discussed earlier, the architectural standard of these buildings generally speaking is much better than the commercial quality seen elsewhere. This is because of the prestigious image which the clients wish to project, the availability of larger funds to achieve this objective and thus the ability to employ selected designers, contractors and manufacturers to ensure better quality work.

Beyond the island expansion

As the island of Abu Dhabi is almost fully utilized, expansion has already taken place on the mainland in an eastward direction across the narrow strait. The area between the roads extending from the two bridges of Muṣaffaḥ and Maqṭa' is already fully developed as a low-rise residential area and community facilities and it is commonly known as 'the district between two bridges'. Attached to this area is a neighbourhood for army officers called the Officers' Town. Another officers' town which is much larger is located to the south of the highway leading from Muṣaffaḥ Bridge eastwards. To the north of the highway leading from Maqṭa' Bridge eastwards light industrial development and warehousing

have appeared. In addition and as mentioned earlier, medium-rise residential development has been implemented in the Muṣaffaḥ area.

To the south of the Muṣaffaḥ area an expansion of industrial land use is currently being implemented in the form of an industrial city. In the area immediately to the south of the Umm Al Nar-Shahāmah Highway a new township, known as Madinat Khalifa, is taking shape as all the basic infrastructure and roads have been completed. This town, which will also be allocated for low-rise residential development, extends all the way to al Mafraq and is divided by the Abu Dhabi International Airport Highway in two parts, Khalifa A and B. Together these two



sections have a size approximately equal to that of Abu Dhabi Island, but have a much lower overall density. This gives an indication of the anticipated magnitude of growth.

Further north, the small settlement of al Shahāmah has, in recent years, witnessed a massive development turning it in a short period of time into a substantial satellite town to Abu Dhabi. Already there are expatriates living in al Shahāmah and commuting to Abu Dhabi, attracted by the relatively low rent. The time taken by road to Abu Dhabi from there is about half an hour. Al Shahāmah is also where nomadic tribes are being settled. Other settlements have been developed north of al Shahāmah such as al Samḥah on the Abu Dhabi–Dubai highway.

Recently the local authorities have started work on a major development to the north of al Mafraq and Banī Yās, namely al Shamkha Town. Unlike Khalifah Town, where housing plots were given to local citizens to build their own villas, al Shamkha Town will be completely built by the authorities as a new town including housing and all the necessary infrastructure and community facilities.

The current expansions and others planned for the future are indicated in the comprehensive Abu Dhabi development plan prepared for the Abu Dhabi Town Planning Department in 1990. Although the plan was not officially published, outline information was available from the Town Planning Department.

Of the future developments, the plan indicates a third bridge to be located to the north of the Maqta' Bridge which will connect the eastern arterial road (Corniche al Qurm Street) to the Umm Al Nar–Shahamah Highway. It also indicates development of islands adjacent to the main Abu Dhabi Island. These are the islands of Sa'diyyāt to the north of the main

Above

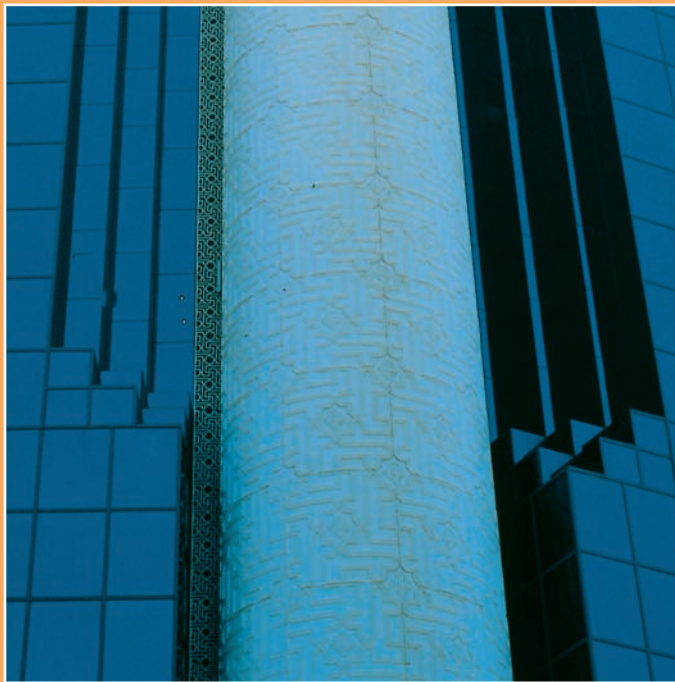
'Zig-Zag' design option for a third bridge crossing, Abu Dhabi (Zaha Hadid Studio, London, 1997). The architects see the location of the new third bridge crossing as critical in the development and completion of the road system which connects Abu Dhabi Island to the mainland. Two structural principles were explored. The zig-zag concept was initially conceived as a tubular steel spine with out-riggers in a steel tubular truss. The central spine is a heavier system of interconnected same straight sections forming pointed arches with secondary struts between, which support the centre of the split deck arrangement

Right

View of a design model for a hotel and residential complex



island, Haydariyat to the south and Lulu to the west. Development at Lulu has already started as mentioned earlier. The other two islands are still in the planning stage. Sa'diyyāt Island was allocated as a free-trading zone and is expected to witness a major development in offices, housing and industrial facilities. Although initial steps were taken to establish a development authority for this island no physical development has started. Haydariyat on the other hand is designated for special residential use such as palaces but no activities have taken place there yet. Bridges and causeways will connect these two islands to Abu Dhabi Island and the mainland. Sa'diyyāt will connect in the north to the Umm Al Nar–Shahamah Highway, Haydariyat in the south to the Muṣaffaḥ industrial estate highway. In effect a full loop of road networks is planned to surround and serve the future conurbation of Greater Abu Dhabi that is rapidly taking shape.



CONSTRAINTS AND OPPORTUNITIES

Contemporary architecture in Abu Dhabi

Abbad Al Radi

The town planning framework

There is a direct link between architectural quality and the town planning framework. In Abu Dhabi, the town planning strategy has not been sufficiently well conceived in the context of a workable long-term framework for the physical, climatic and socio-cultural planning requirements. Consequently, the history of architecture in Abu Dhabi over the past thirty years has been governed to a considerable degree by constraints and consequent missed opportunities. Specific planning issues which have a direct impact on architectural quality can be objectively considered. These include town planning and commercial considerations and the influence of building life span, permanency and demography. The focus here is the heart of the city, the high-rise downtown commercial/residential section of Abu Dhabi.

Plot sizes are generally very small in Abu Dhabi. The vast majority of plots are 24 x 15 metres, and these are followed by square plots of 24 x 24 metres and 30 x 30 metres. Naturally there are some plot sizes in between and some which are larger, but these three sizes represent up to 95 per cent of plots for commercial/residential multi-storey development. For multi-storey buildings with an average height of twenty storeys, such plots are indeed small and leave very little room for architectural manoeuvre, especially when combined with the additional constraints discussed later. The plots are

also far too small to allow for economically viable underground parking provision. If we take such plot sizes in conjunction with the standard system of having 3–12 metres separating plots, with the norm being approximately 3 metres, the resulting cityscape is a relentless vista of building after building with small gaps which fails to create the sense of urbanism more common in central city blocks elsewhere. Traditionally, urban areas are formed by far more expansive building blocks with clearer continuity; this is to a large extent missing in Abu Dhabi.

The planning bye-law that allows for cantilevers of 1.5 metres above mezzanine level not only leads to the awkward subdivision of a building's façade but all too often has a detrimental effect on overall architectural quality. Cantilevers are used all around the plot to the maximum possible and balconies are considered a waste of rentable floorspace. This not only goes a long way to producing the unvarying and standardized buildings already referred to but is also a poor model in terms of the internal living environment and overall architectural quality.

Illustrations of typical commercial buildings show this issue and demonstrate the standard 'one step' silhouette which constitutes the typical Abu Dhabi building block. This repetitiveness in the design of

buildings is the result of having a ground floor plus mezzanine as one building block with a 10–18 storey residential block superimposed on top.

Such planning bye-laws need to be considered together with the overall commercial approach to architecture and buildings in general. Architecture has become solely a business proposition. This translates in architectural terms to a demand for an absolute maximization of floorspace as permitted by town planning regulations. To further maximize the economic return, all too often the internal and external building finishes are of cheap quality. It should be said, however, that change is underway insofar as better-quality materials are being used in the newer generation of buildings, but the underlying strategic planning problems remain and aesthetic quality could certainly be greatly improved.

The planning requirement for an Arab/Islamic image or elevational treatment of buildings is at best a superficial intervention and too often results in architectural pastiche. There is no Arab/Islamic high-rise architectural tradition barring the exceptional North Yemeni and Hadhrami tradition of buildings up to eight or ten storeys high. However, such architecture is uniquely adapted to its own specific context and is not necessarily appropriate for modern high-rise buildings. Attempts to transplant the Arab/Islamic traditions from low-rise, inward-looking buildings to modern high-rise, outward-looking buildings are invariably superficial and are not based on a clear set of acceptable principles.

The detrimental effects of incorporating so-called Islamic features in high-rise buildings is illustrated in typical buildings where arches of different forms and sizes, including circular, flat, stepped and pointed, are used without compunction and can sometimes even be seen in the same building. In addition to arches, the indiscriminate use of Islamic decorative motifs and patterns to cover any remaining blank areas are typical.

The transport system and parking provision in general have not been given sufficient importance, particularly the regular upgrading of roads and intersections that is necessary to cope with the steadily increasing traffic flows and car ownership. Short-term measures, however, do not result in satisfactory technical

solutions, as long as there is an absence of a comprehensive framework in the form of a carefully conceived transport system for the city. Growth and development have not been governed by a technically sound medium- or long-term strategy, and herein lies the crux of the problem.

Parking provision consists of ad hoc parking around buildings, wherever space permits. This results in a generally poor environmental context, as the visual effect of a mass of vehicles surrounding tall urban structures leaves little room for a pleasurable and expansive pedestrian environment. Furthermore, the result is a gross undersupply of parking requirements, with demand being partially catered for by illegal parking. Parking structures have been proposed in order to alleviate this situation and some are already under construction, but they fail to address the real problem.

The problem of parking space could be solved and the architectural quality of buildings would be improved if building plots were increased to a size that was large enough for a number of basement parking levels. A relatively simple exercise in land-use management proves that with larger plots the same floorspace can be achieved with lower building heights and with a greatly improved pedestrian environment. The city must also serve people, not just the car.

It is evident that existing town planning regulations are not conducive to high-quality architecture, and the question of determining an architectural style that belongs to the region is a complex issue which requires considerable courage and inventiveness at both the planning level and the specifically architectural level. These micro and macro issues must be dealt with together as they are inextricably interconnected. Only then can we reach a meaningful vernacular for architecture that could replace the existing subjective and essentially superficial approach.

Commercial and economic considerations

There is little incentive in Abu Dhabi to construct buildings that last. Building plots are often a gift from the Government, with 100 per cent funding at negligible interest, and a good portion of the rent is passed on to the owners pending the return of the loan, often achieved within six or seven years. The aim of getting a financial return on government investment in the least time possible leads to a short-term outlook, and consequently the development and growth of the central city becomes solely a business proposition.

The phenomenal wealth of the UAE, which has oil reserves that are sufficient for well over one hundred years, has engendered an attitude which places little emphasis on the permanency of buildings. Most of the existing twenty-storey buildings have replaced earlier 5–7 storey buildings on the same plot, sometimes in as short a time span as ten years. The equitable system of distributing the wealth of the country to nationals through what is effectively the donation of buildings has, though exemplary, shown a considerable lack of foresight. The primary consideration of developing and distributing wealth within the nation has been undertaken with haste, and it is evident that this has not been conducive to the creation of quality architecture.

Many of the high-rise apartment buildings which dominate the city are owned by nationals, but are seldom lived in by nationals. They are built instead to house the majority expatriate community, who inevitably lack a sense of permanency in Abu Dhabi. There is no point of reference or social criteria influencing the architecture: socio-cultural norms are not in tandem and are not reflected in physical form or the environment. None of this is conducive to the creation of ‘architectural roots’.

The nature of the architectural profession in Abu Dhabi has in itself had a major impact on the quality of development. From the early days, the profession has comprised people from very different backgrounds and

nationalities who have often lacked knowledge of the local heritage and have had to work without correct or effective planning regulations and cultural guidance. The result was and remains an experimental field, often marked with tortuous attempts to break from existing norms. The low fee scales applied in Abu Dhabi of 4 per cent for commercial buildings has not helped to improve either the quality of the architects or the architecture. However, over the past ten years there has been some improvement in the profession and this is becoming evident in some of the high-quality buildings recently constructed or currently under construction.

This discussion represents an overview of what I perceive to be the main constraints on architectural quality and missed opportunities, and is intended to be a frank and honest exposé of the facts. Mistakes have been made in the past and it is my hope that an open discussion of them will encourage an improvement in the next generation of architectural work. In the long term, a review of the urban-planning framework is an absolute prerequisite and will in itself dictate a far higher standard of development. The following section looks at examples of fairly recent contemporary architecture in Abu Dhabi.

The new architecture

The country and its people have advanced rapidly and are now beginning to demand much better buildings. This is particularly the case with government or semi-government-related clients who have a long-term view and are now aware of what good, or certainly better, architecture is, and are prepared to pay for it. In this section I have undertaken a review of some examples of contemporary architecture, with particular emphasis on government buildings. These are not subject to quite the same pressures and constraints described earlier, which apply mainly to commercial and residential buildings. However, government buildings represent a very small percentage of buildings in Abu Dhabi, whereas commercial and residential ones represent the majority and give Abu Dhabi its particular image.

Most of the buildings in this selection have been the subject of architectural competitions. However, my intention is to refrain from subjective speculation on what is good or bad architecture, and rather concentrate on those projects which can be described fairly objectively as displaying aspects of good architectural practice. Specific positive or negative features or missed opportunities are also highlighted.

The buildings under review for Abu Dhabi fall into the following categories: buildings for public use, hotels, office buildings (all publicly/semi-publicly owned), special projects and commercial/residential buildings.

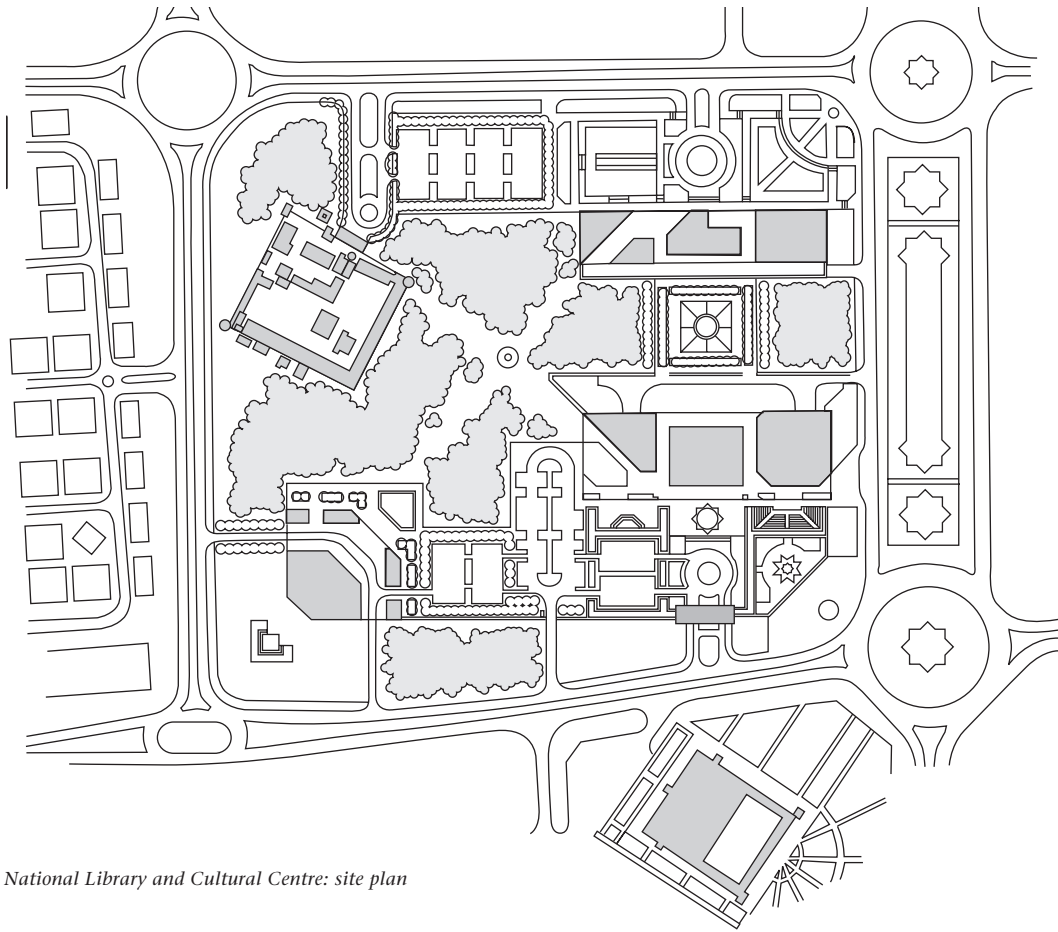
Cultural Foundation

This is one of the first building complexes in Abu Dhabi which can be described as being contemporary. It was designed by The Architects Collaborative (TAC) of Cambridge, Massachusetts, USA in 1977 and completed in March 1981, for the Abu Dhabi Cultural Foundation, a government body. It is located on a unique and very large site in central Abu Dhabi which also contains Qasr al-Ḥuṣn, the only remaining traditional building in Abu Dhabi; previously the Ruler's residence and office, it now operates as the Documentation and

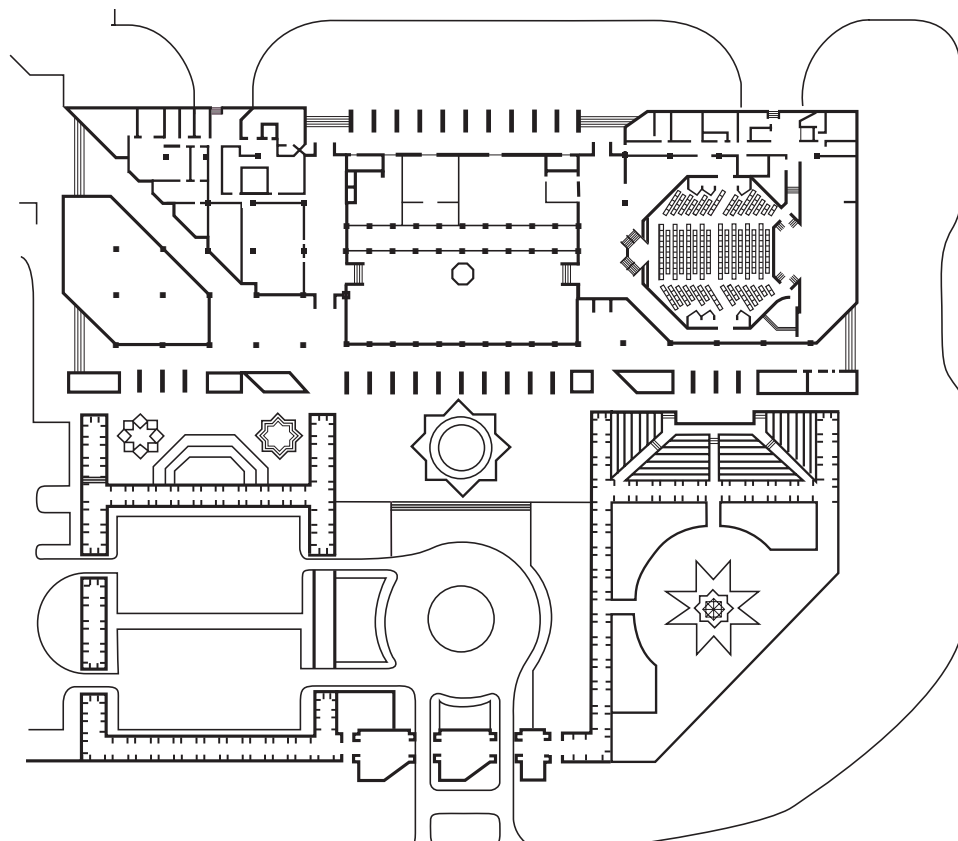
Research Centre. This Cultural Foundation complex is successful and hosts a range of cultural events such as concerts, films, exhibitions, talks and lectures, educational workshops and classes and children's events.

The complex has three main components: the national library, the cultural centre (the galleries, lecture halls, exhibition areas) (known as the National Library and Cultural Centre) and the 1,000-seat auditorium. There is also a children's library on the ground floor. These are all located adjacent to one another within a single rectangular block. The scheme is successful architecturally and the complex can be described as using the local vernacular idiom with its great arched arcades, internal three-storey atria and small-scale arched fenestration on the upper levels. The dominant features of the building are the massive white concrete walls and the use of intricate arabesque tiles along the arcades. This gives the scheme a certain Arab/Islamic character without descending into pastiche. The affinity with the Middle East in terms of design can be traced back to TAC's design roots in the area: in particular they were responsible for designing a major master plan plus numerous buildings for the Baghdad University Campus in the 1950s and 1960s.

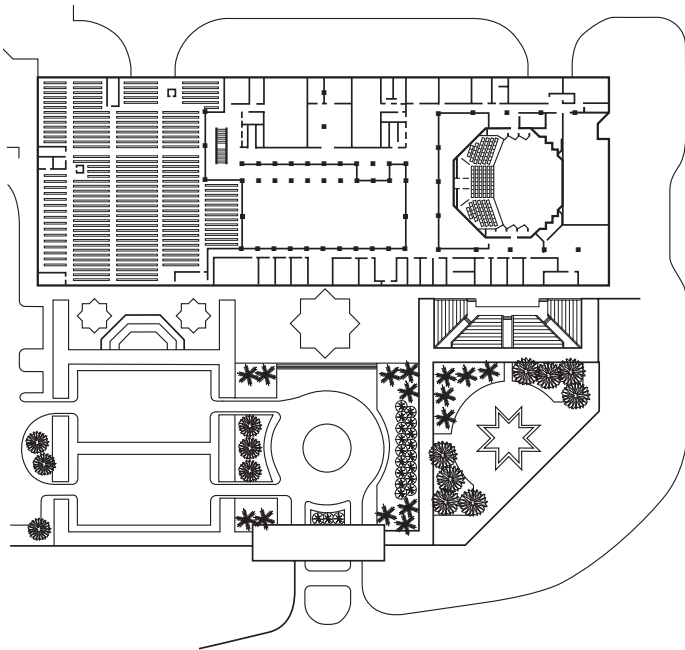
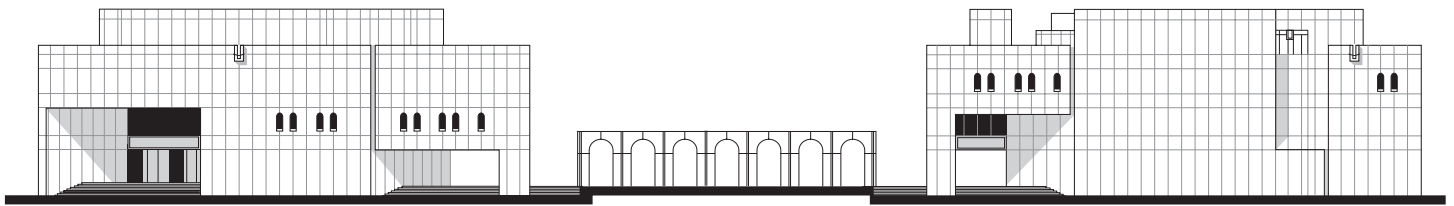
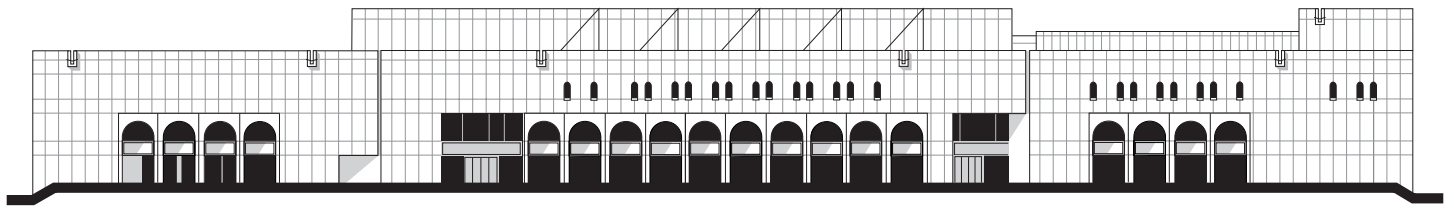
The main design concern in the Cultural Foundation complex is that the external arcades, which are abundant in the front courts, do not form a fully identifiable and functional circulation network connecting the individual buildings to one another, which would give the arcades a *raison d'être*. Instead the arcades are a somewhat abstract adjunct in front of a large monolithic complex which could perhaps have been divided into three main components interconnected by arcades and courtyards in order to form a more meaningful whole.



Above
The Cultural Foundation, National Library and Cultural Centre: site plan



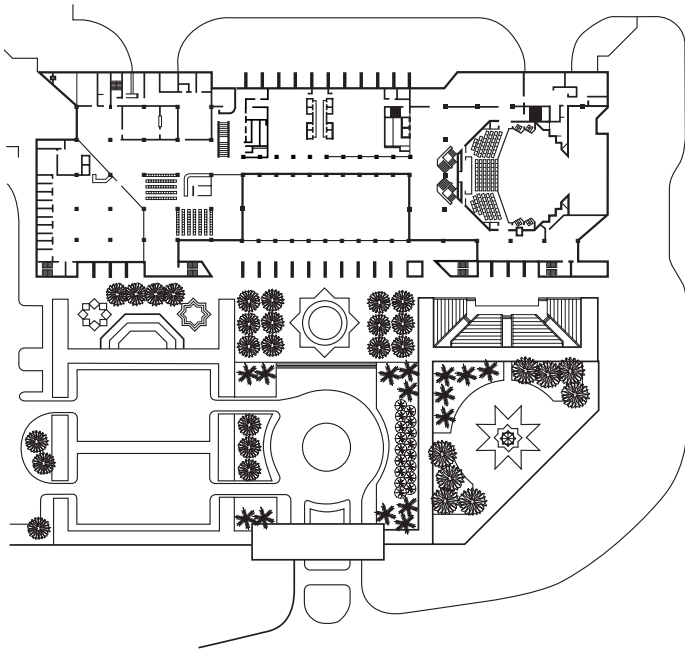
Above
The Cultural Foundation, National Library and Cultural Centre: ground-floor plan



Top
The Cultural Foundation, National Library and Cultural Centre: elevations; south-east, south-west and north-east

Above
The Cultural Foundation, National Library and Cultural Centre: Second-floor plan

Right
The Cultural Foundation, National Library and Cultural Centre: details of the white fair-faced concrete façade. The rendering of the exterior is mastered by a line of discreet and impressive design that has not been matched in style and form

**Left**

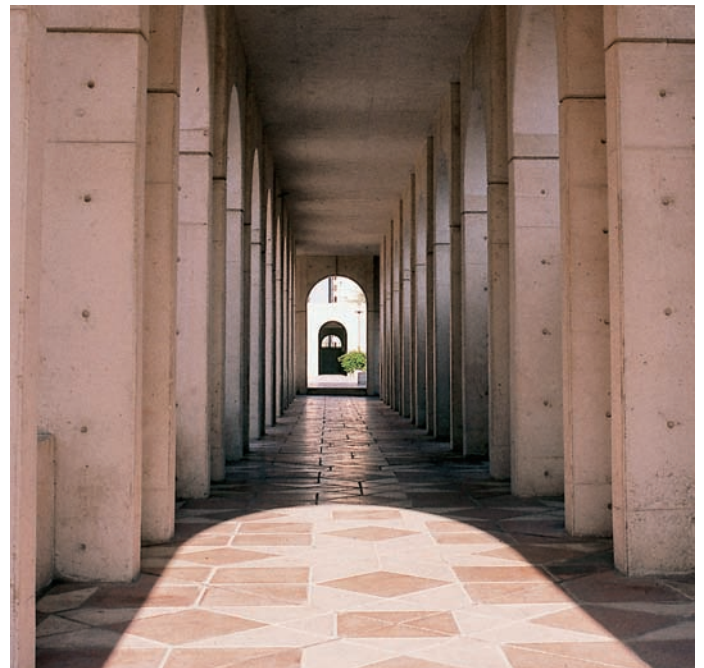
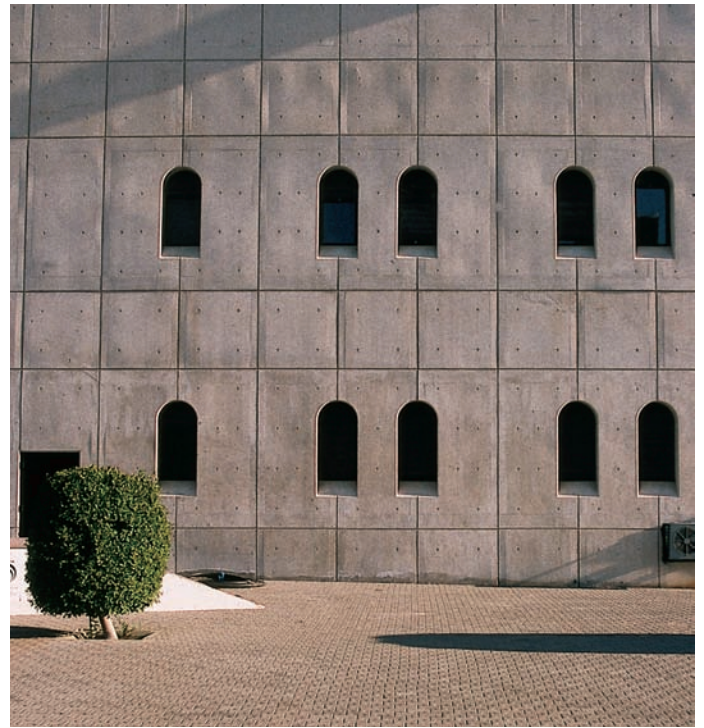
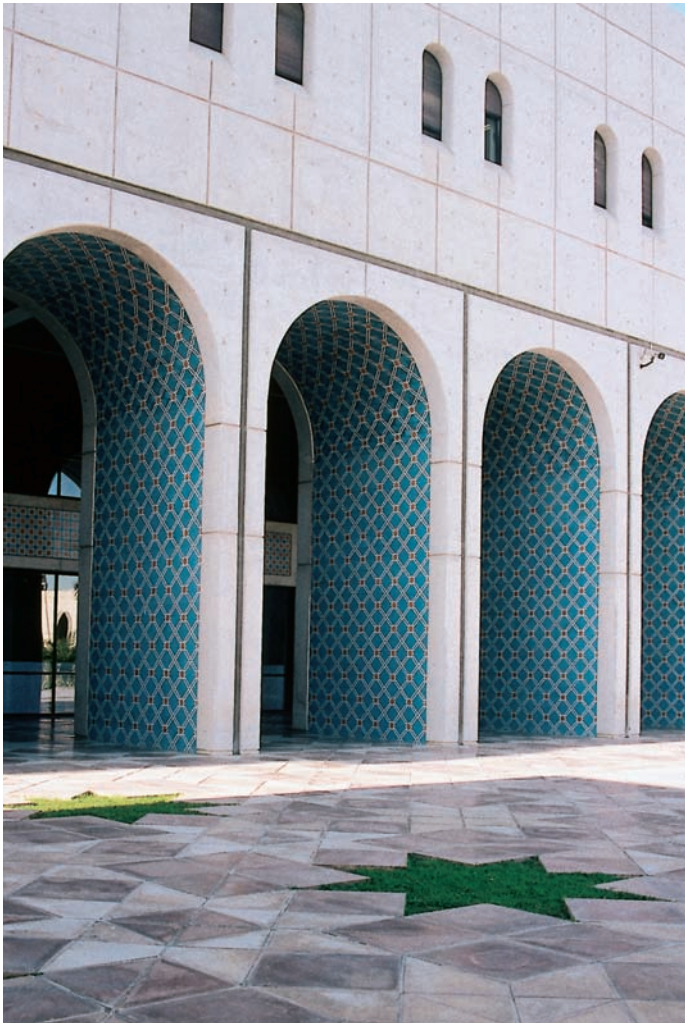
*The Cultural Foundation, National Library and Cultural Centre:
First-floor plan*

Bottom left and right

Views of the entrance arcade and arches opening onto the courtyard. Decorative geometric patterns adorn the floors and panels lining the arches, and are finished in hand-painted ceramic tiles based on the square and eight-pointed star motif

Below

Situated on a prominent site, opposite the Grand Mosque and adjacent to the old fort and palace, this is a view of the main off-street entrance façade, adjacent to the parking area. The austerity of the openings and minimalist design of the building are attractive yet understated



Central Meat, Fish, Fruit and Vegetable Market

The Abu Dhabi Municipality owns and runs the Central Meat, Fish, Fruit and Vegetable Market. It was designed by Planar, Abu Dhabi, together with Skaarup and Jespersen, of Copenhagen, Denmark, who were involved at the initial stages only. The project was completed in 1992.

In keeping with the instructions of HH Shaykh Zayed Bin Sultan Al Nahyan, domes were incorporated into each atrium. In addition, the original floor plan, which subdivided the ground floor into meat, fish, fruit and vegetable markets and designated the first floor for household goods, was changed to having the ground floor devoted equally to meat and fish markets and the first floor solely used for the fruit and vegetable markets. As a result, the internal functioning of this ground and first floor plan is not ideal – fruit and vegetable markets demand large deliveries, and lead to bulk refuse, with generally greater and more regular bulk purchasing by customers than in meat and fish markets. In design terms this entailed substantial internal changes: a major ramp was added together with numerous service lifts and escalators to cater for the requirements of the first floor.

The client wanted an Arab/Islamic architectural treatment and for the *sūq* to be designed in keeping internally with traditional Arab markets. The architects were, however, keen to avoid the pastiche Islamic *sūq*



Above
Panoramic view of the Central Meat, Fish, Fruit and Vegetable Market



Above right and right
Closer view showing the entrance to the market

**Above**

Arcades and architectural massing of the Central Meat, Fish, Fruit and Vegetable Market

which predominates in the Gulf. The design consists of a number of barrel-vaulted *sūq* malls organized in a geometric plan form; these linear malls form the numerous entrances to the market and meet in a central atrium. The same basic *sūq* unit centred around an atrium is repeated twice in a geometric manner. The use of external arcades all around provides shaded walkways and weather protection, and internal arcades on the first floor serve the shops.

The massive external concrete walls, with embedded lines forming geometric patterns and single turquoise tiles at the junctions of these lines, enhance the feeling of regional vernacular but with a distinctly modern spirit. The use of prefabricated concrete panels is extensive in the *sūq*, and the liberal use of tiles in the interior, together with the other features, produces a design that is in keeping with Arab/Islamic architectural traditions.

Khaldeya Cooperative Society Building

This building represents one of the very few private shopping mall structures in Abu Dhabi. It was designed by Planar, Abu Dhabi and completed in 1996. The project takes the essentially Western phenomenon of the mall/department store and adapts it to suit the local environment, without undermining any functional

**Above**

Khaldeya Cooperative Society Building: entrance detail

requirements and without resorting to Islamic pastiche. It comprises a relatively small three-storey building, with the ground floor originally allotted to the Khaldeya Cooperative Society supermarket and the remainder leased. As it transpired, the entire building was leased to a single operator who turned it into what is effectively a single large department store with an internal ground-floor supermarket. This indicates the level of built-in flexibility of the project which was designed to have internal *sūq* streets on the mezzanine and first floors and which were subsequently successfully converted to an open-plan department store.

The design concept revolves around a diagonally accessed mall with an adjacent atrium around which the building functions. The atrium and diagonal mall are effectively linked so that they open onto each other and share a frame roof which has a sufficient number of pyramid skylights to provide natural light, whilst avoiding excessive heat-gain. The external treatment of the building is one of contrasts: it combines a blend of grooved geometric lines, small-scale arched fenestration, stepped lines and restrained north-facing glass curtain walling. The architectural idiom is underpinned by geometric principles that run throughout the project, and the end product may be described as modern vernacular architecture appropriate to the region.



Top and above

Details of the façade and an interior view of the lightweight truss roof structure

Left

Khaldeya Cooperative Society building: diagonal axis and entrance

Hotel Intercontinental

Built in 1979 in a relatively secluded part of the Island, this extremely luxurious hotel, designed by Benjamin Thompson and Associates of Cambridge, Mass., USA, is possibly the first integrated hotel/leisure complex which places equal emphasis on the external areas (including landscaping, marina, beach) and the internal (the hotel rooms, conference and banqueting facilities). It was commissioned by the government of Abu Dhabi in order to accommodate the seven heads of member states of the Gulf Cooperation Council (leaders of some of the wealthiest nations in the world) during summits. The hotel has over 300 deluxe suites, the extremely luxurious royal suites and a plethora of banqueting facilities and conference halls. It is evident that no expense was spared, especially in the internal finishes.

From a design point of view, there are a number of interesting aspects. The exterior of the building is straight-forward and subdued and belongs to the international architectural style of the period, but its interiors have a very different feel. This is particularly the case in the public areas, which are resplendent with an abundance of rich arabesque. This dual personality is surprising as the expectation in a building of this nature is for the luxurious interior to be reflected on the exterior. Other areas of interest are found in the marina and general landscaping, which are very well designed. The entrance is located at the top of an artificial hill that gives Abu Dhabi its only distinctive land contour, and together the external grounds and marina give the hotel a very special atmosphere.

Forte Grand Hotel

This five-star hotel is unlike the Intercontinental in that it is located in the commercial heart of the city and is very much a businessman's hotel. Designed conceptually by a well-known architect, Arthur Erickson of Vancouver, Canada, the building was completed in 1993 and has 31 floors. There is no doubt that the building is an architectural statement with its very hard and closed granite-faced rear façade contrasting with the completely curtain-walled sea view. Because of its very particular curved-plan form, the building effectively



Above

Close-up of the Hotel Intercontinental's seaside façade

has only two façades. The applicability of full curtain walling in this region is questionable. It certainly looks aesthetically pleasing in this building, particularly when seen with the strongly contrasting closed rear façade, but can it be considered an appropriate architectural solution for this part of the world? At the top the parapets curve upwards, terminating the building nicely. However, the rotating restaurant sits uncomfortably above, and is more akin to a foreign body in an otherwise interesting design.

There are two eight-storey satellite towers which have a triangular-plan form and accommodate common facilities. Again the contrast of glass curtain wall and hard granite walls is striking. All rooms have a sea view

**Left**

The Forte Grand Hotel. The hotel design has all the guest rooms on the sea façade, with the service areas at the back. The revolving disc crowning the rooftop of the tower is a restaurant

as the plan has a single-access corridor format. As attractive as this concept may be, it reduces the hotel's economic viability considerably. It must be said that the interior functioning of the building as a hotel is not particularly good, especially in terms of common facilities and servicing aspects. The main kitchens are located on the fifth floor, with all the inherent servicing problems. There is a distinct shortage of other service-related spaces such as laundry, stores and staff changing rooms, in addition to the absence of an essential requirement for a five-star hotel – namely a banqueting hall. Though striking from the point of view of external architectural form, the hotel cannot be said to be similarly successful from an economic or functional viewpoint.

Etisalat Headquarters Building

This project was awarded to architect Arthur Erickson of Vancouver, Canada, and was completed in November 1992. The building contains the headquarters for Etisalat, the telecommunications company of the Emirates, and consists of a 24-storey office tower with an adjacent parking structure for 200 cars.

The first three levels of the tower, which are interconnected by an atrium space, are open to the public. The ground floor features a museum that is intended to illustrate the history and development of telecommunications from the invention of the telegraph to modern-day satellite systems. From the ground floor, two sets of escalators provide public access to the two levels above, where the counters for payment of bills and information concerning telephone systems are located. All the office levels above are for the private use of the company to house its various departments. The only exception to this is the fifth level, which is occupied by a small 200-seat auditorium for lectures and small conferences. The fifth level is also linked to the top of the parking structure, which accommodates employees' amenities including a kitchen and café, a games room and a prayer room.

**Above**

The Etisalat Headquarters. Replicas of this building, much admired locally, including the gigantic golf ball sphere placed on top, appear in other cities such as Dubai and Ra's al Khaymah

The external envelope of the building is made of granite cladding and green-tinted mirror glass arranged in a faceted curtain wall. The pair of tall external columns, the main feature of the façade, are clad in aluminium. The external image of the building is warm and elegant, but the internal arrangement is slightly less satisfactory. This is mainly due to the internal office partitioning system, which lacks clear and sensible subdivisions of floorspace between open-plan office areas and private offices, to the detriment of the open-plan areas. In this context the faceted curtain wall creates awkward spaces. In addition, the visitor passenger-lift

**Above**

View of the Union National Bank Head Office Building

lobbies are awkwardly juxtaposed with the office areas they serve.

At the top of the building, a large 22-metre diameter sphere of Teflon-coated material houses a complex array of parabolic dishes and antenna for Etisalat's telecommunications needs. This sphere is illuminated at night and has become a city landmark in Abu Dhabi.

Union National Bank Head Office Building

This building represents one of the few purpose-built office buildings of a high quality. Designed by Carlos Ott, famous as the winner of the Bastille Opera

House competition, and completed in November 1994, it consists of two basement car parking levels, an interconnected ground- and mezzanine-level bank, and 14 typical open-plan office floors, the thirteenth and fourteenth floors being smaller in area. The bank occupies all floors up to the sixth inclusive, with the remaining floors being let. This system operates by having an additional side entrance with a two-lift core which only serves the upper floors, for use by the tenants. The bank can expand upwards by simply controlling lift-door openings, thereby allowing for internal flexibility in use.

The building is fairly typical of the standard international style of office buildings, and as such it could be located anywhere in the world. The plan form is very effective, with the vertical core located on one side to service open-plan office floors. Externally the building is finished with a granite frame within which sits a cantilevered curtain wall of double glazing and aluminium panels. The internal finishes are of an equally high standard. In comparing such buildings to the standard commercial ones in Abu Dhabi, it must be borne in mind that the square metre costs in these high-quality, prestigious 'intelligent' office buildings are about twice the cost of standard commercial buildings.

Shaykh Saif Bin Muḥammad Bin Butti Building

The architects were asked to design this multi-storey building, completed in 1991, with an Arab/Islamic image in mind. In that there is no historical precedent for such buildings in Arab/Islamic cultures, the architects, Planar of Abu Dhabi, tried to create a design that would avoid Islamic pastiche. The design in plan form comprises two triangles separated by a linear circulation link. The philosophy adopted for the façade was first to break up the height visually so as to avoid monotony by having the image of three building blocks of different heights (six, three and four storeys) in visual terms one on top of the other with a separating floor in between. These blocks are cantilevered out to enhance this image, and the use of *mashrabiyyah* ensures shading while enhancing the image of the building as belonging to the region.



Left

Shaykh Saif Bin Muḥammad Bin Butti Building: massing, framing and division into 'three buildings'

Below

Overview illustration: diagonal axis, pyramids, pre-cast pattern and sea view



The commercial nature of the project greatly limited the scope of materials used, resulting in a painted frame as opposed to the intended granite finish. Extensive use of white concrete pre-cast panels and GRC lattice-work was used in the external cladding. This allowed for repetitive geometric patterns embossed in the white concrete panels, giving the building its individual character. The plant on the roof was hidden within two pyramidal structures, which also reflect the twin triangular plan form. The original intention was to have shaded balconies, providing external 'gardens in the sky' all around. This approach reduces internal glare and provides much-needed shading to the internal glazing, thereby increasing natural comfort while reducing the cooling load for air-conditioning. This full extra skin, while reduced somewhat by the commercial dictates of additional space requirements, still features in a substantial part of the plan.

Raisa Bint Darwish Building

This building designed by Planar, Abu Dhabi, and completed in 1991 had very severe commercial and budgetary constraints, with the client requiring five flats per floor on a plot measuring 24 x 24 metres (two 3-bedroom flats plus three 2-bedroom flats). This resulted in small flats, and in keeping with the highly commercial nature of most projects in Abu Dhabi, the client required the floorspace to be maximized to the extent allowed by the bye-laws. This would have resulted in a 1.5-metre cantilever from the first floor up, thereby greatly limiting design quality. In actual fact, as can be seen, the client was persuaded to allow for a framing of the structure within which the cantilevered portion rests, thereby improving on the architectural image. However, balcony floorspace, which acts as a second skin and is an ideal tool against the harsh climate, was unfortunately greatly reduced for the same commercial reasons. This approach would not only improve the microclimate but also the internal environment.

The use of two triangles in plan form was utilized to define the diagonal axis towards the main city square and the sea. Extensive use of pre-cast white concrete external panels were used with a repetitive square-based pattern



Top

Raisa Bint Darwish Building: detail of white concrete pre-cast panels and pattern

Above

Overall massing and diagonal entrance



Top
Raisa Bint Darwish Building:
external details

Above
External details

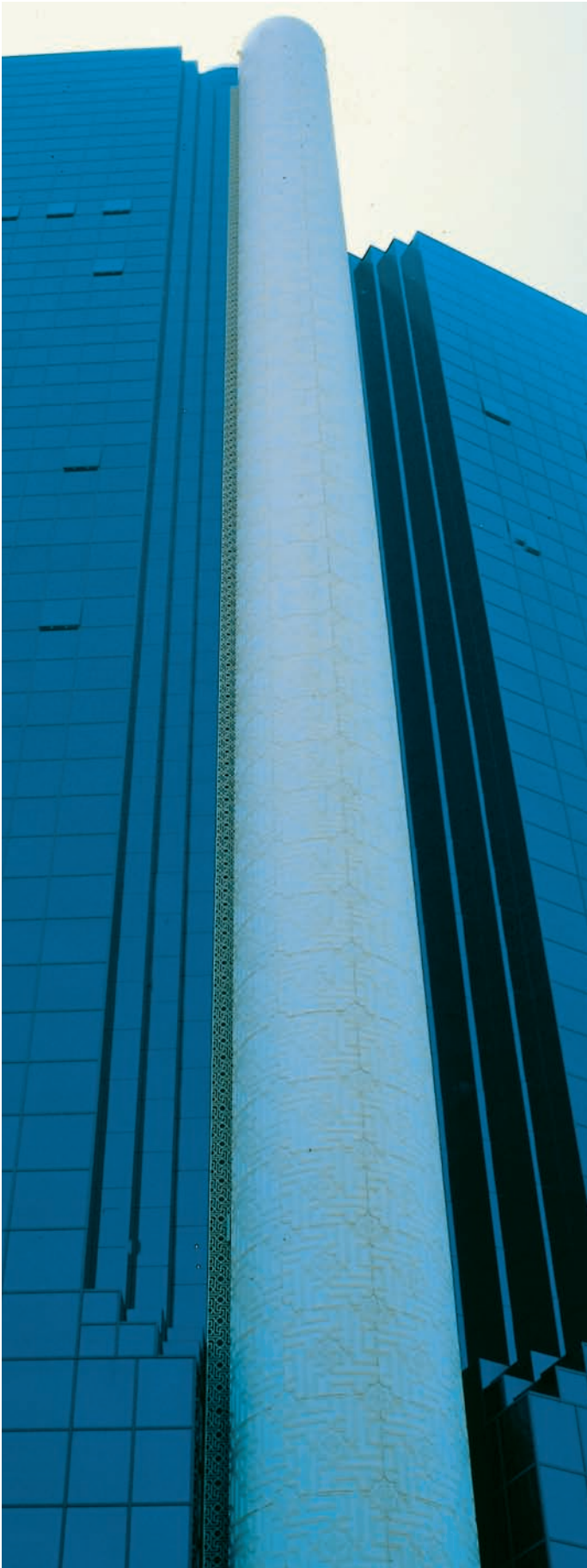
of grainy diagonal lines in alternating directions. The use of this pattern and texture gives the building a local vernacular feel. The colours white and off-white were used throughout, with white concrete, off-white tiling and white aluminium. The plant is hidden behind a high roof-parapet wall forming a backdrop to a number of free-standing columns with capitals which extend the structural members beyond the roof as a purely architectural feature.

Baynunah Tower

This building is, to date, the tallest residential tower in the region. Designed by Arkan, Abu Dhabi, the building was completed in 1995. It is composed of three tower blocks of 25, 31 and 37 storeys respectively, which surround a central circulation shaft that rises up to 42 storeys. The architects' intention in this massing was to give the building dynamism when viewed from different angles. The building has six floors of parking from ground level up and contains a small hotel at the lower levels in the four floors above the parking area, with the remaining residential levels located above. The sports club (swimming pool, health club) is located on Level 29.

The plan form is not straightforward and is perhaps difficult to fully comprehend with many different angles to give individual identity to the various tower blocks. This is probably partly due to the awkward site. The main body of the tower is completely clad in glass except for a series of circular staircase towers which are clad in white GRC, which is excessively glossy. The question of applicability of full curtain walling in buildings in this part of the world is one that recurs. Clients often demand this treatment in order to produce what is felt to be a modern building, although it is the view of the author that curtain walling should be used with care in this region and generally should not be used for residential buildings. This building dominates the Abu Dhabi skyline.

Internally, the building is generally well designed in terms of the atrium, overall circulation space in the hotel and privacy. The hotel rooms are well designed and the sea view is enthralling, when one looks down from the window.



Rabdan Complex

This major project, completed in 1998, is one of the largest commercial/residential projects in Abu Dhabi, costing about Dirhams 245 million. The project was designed by Carlos Ott, with detailed engineering and supervision by Dewan, Abu Dhabi.

The project consists of three residential towers with alternating curved façades resting on a ground- and first-floor podium that comprises two levels of shopping with 6,000 square metres of retail floorspace. There are also two basement levels of car parking for approximately 280 cars. This project has very distinctive architectural features and certainly has architectural quality with its series of curved façades. The earlier discourse on the highly questionable applicability of curtain-wall glazing to residential towers remains at issue. Although the extensive curtain-wall glazing set off against solid granite-faced façades is in principle aesthetically pleasing, an impression of excess remains in this scheme with its abundance of glazed and highly reflective curtain walls. The granite façades dominate the external image, and are put together in a wide variety of different curves, both horizontally and vertically, in the three towers. There is insufficient car parking in this highly congested area, especially for potential shoppers and visitors.

Left

Baynunah Tower: external details showing the cladding and the cylindrical towers in white geometric tile panels, with a repeated pattern based on the eight-point star. A brass grille in the same pattern provides filtered lighting. The entire building's façade is encased in deep-blue reflective glass. A subtle interpretation of the Islamic squinch forms an interesting movement, breaking the surface of the corner edge

Right

The Rabdan Centre, a commercial complex of two adjacent towers under construction. Located adjacent to the Etisalat Headquarters (Carlos Ott, 1998)





HOUSING DEVELOPMENT IN AL 'AYN

Talal M. Abdullah'

Mass housing and changes in settlement patterns

Since the 1970s and the establishment of the oil economy, the government's policy of investing revenue in urbanization has resulted in the construction of extensive urban housing projects. But during work on government-sponsored town planning initiatives, including the preparation of detailed local plans for different parts of the city of al 'Ayn, the writer has become aware of a number of issues influencing the way in which an architectural approach is formulated.

In the first place there is the difficulty of evolving a brief to give to an architect who may not be familiar with the local architectural vocabulary, especially if they are foreign, since many architects working in the United Arab Emirates are expatriates. Then there is the question of deciding on appropriate allocations of space: how large the rooms should be, and how they match both the client's expectations and his actual requirements. Again, these are issues of which the designer may have little understanding. What he does have, however, are the tools, the architectural vocabulary and expertise for turning the brief into a reality, translating the design from paper to construction. But it is during this process that the lack of a common language between architect and client becomes apparent, and problems tend to arise.

The client lacks the architect's sensitivity for the built environment, but has a good understanding of his own needs and the measures he deems appropriate to meet them. For example, he may have a very good idea of how the internal circulation of the house should work in general terms; but, on the other hand, he probably will not be capable of envisaging the precise relationship of corridors and transitional spaces, open or closed lobbies, which is the architect's responsibility. Since close cooperation between the two parties cannot always be achieved, the building work tends to suffer during the implementation stages.

One of the problems is that, in the case of governmental projects, particularly social housing schemes, the departments involved in putting together the design briefs and competition invitations are not precise enough about the design vocabulary to be used. As a result, the mass housing built for urban locations looks the same as housing built in the city outskirts, or even in the desert, even though the design criteria are very different; for example, climatic conditions, the need for outbuildings to house animals, and different uses of open and covered spaces. The other problem is that of the architect having a different cultural background which is not necessarily sympathetic to that of the groups he is designing for.

Since no research into the requirements of the locals is carried out, we end up with designs which are far from ideal, and the problems continue. Requests for alterations are inevitably made within a few months of a house being completed and handed over to the client, and the work will probably start before the end of the first year of occupation. Complaints usually concern either shortage of space, the style of the architecture, height of boundary walls and gates, or the location of the reception room, kitchen or bathroom.

These are the issues which were investigated by the study of 1,200 low-cost government houses in al Markhāniyyah.² During the course of this research a questionnaire was prepared to be filled out by occupants, the premises were photographed and surveyed, and all the applications for alterations received by the Municipal Engineering Department were analysed. For instance, someone might request permission to build a new kitchen, even though a kitchen has already been provided, because he feels the location of the kitchen at the front of the house is wrong. In fact this layout is a big change for a person coming from a rural or non-urban environment. It would be better if prospective occupants could be interviewed in advance to ascertain their needs more precisely. For example, it might be more appropriate to design kitchens detached from the house, due to the nature of preparing food and cooking on a large scale. This is not only a more hygienic arrangement, which helps to disperse cooking smells, but it also provides a degree of separation which respects the privacy of the house, since most of the cooking is carried out by maids and cooks who are not actually part of the family. These then are particular social conventions which the architect needs to be aware of, and which make an open-plan design approach inappropriate and inefficient.

The question is whether the client should be expected to adapt to the new environment or whether he should be allowed to change it. Most often he will do the latter, since it is more difficult to change one's customs and expectations. This will happen gradually over time, so that by the second or third generation occupants are accustomed to the urban environment, but when the houses are first built it is quite common to see tents

constructed on heaps of sand outside to serve as a traditional external winter *majlis* where passers-by, neighbours and friends can be received. This practice could be incorporated into the design of the houses to form an interesting feature, and some architects have started to take it into account by providing a *dakkah*, or elevated platform, at the front of the house, supporting a wood or metal frame to enable a tent or *bayt sha'ar* to be erected in winter and removed in summer when it is hot. Al 'Ayn has a pleasant climate during the summer nights, dry and free of humidity, and people enjoy sitting outside. The traditional concepts of the *liwān* and colonnaded arcade were a response to these climatic conditions, and provided an alternative living space to the enclosed interiors, allowing enjoyment of the fresh air and sunshine.

One of the reasons for difficulties in adjusting to the urban environment is that many people come to the city from nomadic settlements, where shelters are no more than a *du'un* or *'arish* made out of *sa'f al nakhil* (woven panels of palm fronds), or sometimes a tent with a *hawsh* around it, which were never grouped close together. The *badū* tribes of al 'Ayn, such as the 'Awāmīr and Manaṣīr, lived in tents rather than the *'ishshab* (while the people who lived near the palm groves in the oasis made light, portable *'arish* dwellings out of palm fronds). When these people move from a totally Bedouin environment, with its inherent freedom of movement, to a highly structured urban environment of roads, schools, services and infrastructure, the transition has to be carefully considered if the alterations to houses which are currently demanded are to be avoided.

Another reason why problems occur is the difficulty of involving the end-user, the client, in the process, partly because of the speed with which housing projects initially had to be constructed in order to settle large numbers of people: what we might call 'quantity-led planning'. This must be replaced by 'quality-led' planning, based on a sensitive response to the requirements of inhabitants, which have of course changed since the first housing prototypes were developed and constructed nearly thirty years ago. Today's society is very different: people in the Emirates operate through mobile phones

and travel to the US and Europe, while the satellite dish and television have dramatically added to the amount of information already made accessible by magazines and other forms of printed media. However, the process of socio-cultural transformation has not necessarily kept pace with these developments, and this makes the task of designing houses a delicate one.

This problem was addressed in a pilot project conducted in the al 'Ayn Town Planning Department, which started by analysing the alterations requested and using the results as a basis for a new design programme. It was concluded that the number of rooms provided has to be a realistic reflection of local expectations, and not simply conform to the standards applied to low-cost housing in other countries – especially when the resources in this country are vast in relation to the small size of the population. Here the extended family unit is quite large, and the birth rate is generally high, so each family may have seven or eight members. Clearly, then, the two- or three-bedroom model of low-cost housing is inadequate, and at least five or six rooms should be provided. In addition to these rooms, there must be a *majlis* area set apart so that guests can come and go without affecting the rest of the household. This area includes separate reception and dining rooms, with an independent entrance from the main house or villa containing the private family living spaces, bedrooms and facilities.

The layout should also include a *liwān* type of terrace, a private entrance to the house independent of the *majlis*, and segregated service quarters. In other words, the building unit is broken down into three constituent parts: the service quarters, including the kitchen, washing and laundry room, store, and maid's room; the villa with the bedrooms, bathrooms and hall; and the *majlis*. In addition there is a garage incorporating accommodation for the family's driver. This organizational structure was used to generate new prototypes constructed in the districts of al Maqām and al Khaznah in al 'Ayn, and they were considered highly successful, with a reduction of requests for alteration works from 90 per cent to a very small number. The architects involved were also asked to design for possible future expansion, so that this could be easily achieved within the parameters of the plan if

the occupants were to request an enlargement of the accommodation.

The dilemma we face now is the size of the building plot. As planners we would suggest that a plot of about 30 x 30 metres is quite a reasonable size, certainly by international standards, or even by those of other Gulf countries such as Kuwait, Bahrain, or in Dubai. In al 'Ayn, however, the minimum size of a privately owned plot is 60 x 60 metres, 3,600 square metres in an urban area with direct access to a street network and infrastructure (electricity, sewerage, drainage and telecommunications). This is nevertheless considered small by owners, who have previously lived in the expanse of the desert, with no defining boundaries except the horizon and the sky. This prompted us to allocate plots of 60 x 90 metres and 90 x 90 metres for a time, until we charted the horizontal growth for the city and discovered that in 1990 we had already hit the urban boundaries that should not have been reached till 2000. In the 1990–95 period we had reached the post-2000 zone within the urban boundaries designated for private residential development as opposed to government housing. This was obviously the result of the large plot allocation precipitated by a government policy of giving free land and subsidized building loans to citizens in order to facilitate the process of settlement and urbanization. The citizen is also given the option of returning the government-owned house he is granted back to the government, in exchange for its value in cash which he can then use to build his own residence privately. These generous measures were implemented in order to encourage people to move to the city, urbanize and share in the wealth of the post-oil era.

The plot size was finally fixed at 60 x 60 metres which helped to contain the horizontal expansion of the city, and the corresponding need for high investment in infrastructure. The first generation of urban settlers did not respond well to the constraints of living on 60 x 60 metres of land, and asked for larger plots of 90 x 90 metres, then up to 90 x 120 metres, and even larger areas. There was a feeling that the perimeter wall surrounding the property should not obstruct the inhabitants' views into the distance. There was also a strong preference for

the colonnaded walkway or arcade known as the *liwān*, or a terrace, which could be used in the evenings, afternoons and mornings for breakfast instead of the expensively furnished, enclosed *majlis*.

The second generation, which has grown up with air-conditioning, television and cars, has found the 60 x 60 metres plot size more acceptable. However, when we were evaluating new villa designs we found that the ideal dimensions for a bedroom could be up to 7 x 10 metres. A room of 5 x 5 metres, which in the UK may be considered a fairly good size, is only considered adequate for a child's room. A master bedroom has to measure between 42 and 49 square metres at the least. This shows how strongly the nomadic origins of the inhabitants influence their response to the urban environment, especially in producing a sense of confinement. There has been an improvement in space standards in housing projects, sometimes through provision of larger courtyard areas, but the first generation complained bitterly about the restriction, and the close proximity of adjacent houses, requesting houses not to be constructed with shared party walls, but with spaces in between. Despite close tribal ties, territorial claims to the land had to be well defined and protected by the boundary wall.

The other dilemma we have faced is the development of architectural style in the UAE. A committee for the preservation of architectural character was formed by the Al 'Ayn Municipality and Town Planning Department in 1987, after a decree issued by Shaykh Zayed in 1985, making it clear that no building permits would be granted unless the design could be related to the heritage of the Gulf area and of the Islamic and Arab traditions.³ The modern architecture of the Emirates, built with functional modern materials and construction technology, was designed to express the development and vast material resources of the country, and had little connection with the local architectural vocabulary. Unfortunately this was most commonly represented by the use of arches, domes and vaults, which actually occur rarely in the history of architecture in the Gulf. There are other elements which are more typical of the architecture of the Gulf such as blind walls, courtyards, arcades, and the friezes at second-floor level. But there

are also differences between the buildings of the interior and those on the coast, in terms of the materials used and architectural character. In Najd, Saudi Arabia, and Bahrain, various initiatives have been taken in developing a vernacular language of architecture, and we hope that the same effort to formulate an architectural style that is appropriate for the UAE will be made by local architects here, instead of each practising in line with his own school of architecture.

Dr Makiya has carried out some research into the characteristics of the coastal architecture of the country, particularly in the area around Dubai, and some local architects have expressed interest in the evolvement of traditional architecture. Otherwise there has been little work in this field to date, and Emirates society has had to endure the wholesale introduction of the International Style into the urban environment. On the Abu Dhabi Corniche, for example, enormous sums have been invested in the construction of modern high-rise buildings. Although some of the architecture is interesting in its own terms, it has no relationship to local social or cultural conditions and could, indeed, be located anywhere in the world. By contrast, the Cultural Foundation (designed by The Architects Collaborative, TAC), adjacent to Qaşr al Ḥuṣn in Abu Dhabi, is clearly a serious attempt at developing a different approach which is respectful of the heritage of the Emirates. Architects should acknowledge their responsibility for achieving this, rather than leaving it to the official government departments which issue the building permits. The architect should be able to achieve a synthesis of the appropriate architectural vocabulary for the urban environment in which he is working.

It is sometimes argued that the architectural heritage in the UAE is not particularly rich to begin with, due to the relatively short history of urbanization here, but there are plenty of sources of inspiration in the historic forts (*ḥuṣn*), towers, old mosques, and vernacular houses of Dubai, Sharjah, or Ra's al Khaymah. Architects are not being asked to duplicate or imitate these buildings from the past, but to develop their typical characteristics in a new spirit. In order to foster such an approach among local architects, and increase awareness of the

built environment amongst the public and government officers, a course in local architectural culture has been set up at the university. This initiative must also be pursued at professional level, among practising architects and engineers, and through the media. Indeed, the publication of this book will also provide an important channel for discussion. Even if we were to achieve only 10 per cent of our goal it would be better than importing a style from a completely different environment.

We are certainly not suggesting that a building should be constructed entirely in adobe bricks with arches, but that it should make some contribution to the creation of an identifiable architecture for the Emirates. Several seminars have now been held on the nature and quality of the urban environment, which have aroused the interest of those responsible in the country. However, what we need now is not a theoretical response to the problem, but tangible measures to clarify the future of the urban environment. It is up to a new generation of local architects to frame a response to people's expectations, and develop a local style which can give clear expression to cultural identity. If changes in customs and patterns of social life are to occur in the long term, they must happen gradually. Furthermore, particularly in the domestic realm, people must be given the chance to express their individuality. One of our problems in popular housing is that every single unit is exactly the same in elevation, layout, gateway design etc. The standardization of blocks has created a repetitive and monotonous environment. It is noticeable that every inhabitant tends to customize and accentuate the entrance to his house, some even rebuilding it in a different style. Others paint their houses in different colours, creating a mosaic-like effect in some of the popular housing projects. Another focus of self-expression is the boundary wall, which, with villas now placed in the centre of the site, takes on something of the character of the *sūr* that encircles old towns and neighbourhoods. We find that the wall may be extended vertically, or painted, or even decorated with features that have nothing to do with the overall design. Thus the tenant finds ways to fight back against the architect, and it becomes clear that if the expectations and requirements of the end-user are not respected, the result will be a state

of architectural chaos. This is vividly demonstrated in the projects built in the last two decades, which have by now been altered beyond recognition.

To avoid the situation which arose in the 1970s, when every local or married person was eligible for a free house and demand dramatically increased, the Abu Dhabi Executive Council has decided to construct 3,000 dwellings in al 'Ayn during the next three years. These will be detached dwellings on a villa model, since multi-storey units are deemed unacceptable. In the past, popular housing was mainly designed on one level, which we supported, but increasingly two storeys were built to accommodate the space requirements of the occupants. As a result, the privacy of neighbouring houses was infringed upon, which may have caused friction. The inhabitants responded by blocking up balconies on the first floor which were exposed to view or allowed overlooking of neighbours.⁴ Some of the inhabitants of these new settlements, who may originally have been Bedouin, commuted to work in the city centres as government employees. In a development of 300 houses in al 'Ayn, we planned a linear residential area with fields on the other side of the road for cultivation, responding to Shaykh Zayed's directive to provide settled urban communities with direct access to the rural landscape. He believed this would encourage settlers to make their living from agriculture, subsidized by the government, and so create a new economic basis in agriculture for the country. It would also provide a disincentive for people to move to the main city centres.⁵

There are two key philosophies behind this planning policy. The first is that the emphasis on agriculture enhances the image of cities such as al 'Ayn, which was originally an oasis, and also ensures food supplies for the country in the long term, bearing in mind that in the next one to two hundred years the economic base in oil production and revenue dependency may change. Thus agriculture beautifies the country, creating a more balanced and sustainable environment, and provides an alternative economic base. The second line of thought, which is geo-political, is that the new settlements help to bridge the long distances between the main urban centres and smaller towns and villages. The new

towns effectively fill a vacuum, and their typical linear plan is generated by their location on the main highways linking the cities. This form of ribbon development is also the most efficient way of tapping into the infrastructure systems which run along the roads between the cities, and eliminates the problems of trying to construct buildings on the sands and among the high desert dunes.

This is the urban morphology that defines the development strip between al 'Ayn and Abu Dhabi. Driving out of al 'Ayn on this route, one passes through al Sulaymān, al Yaḥr, then Sād, Bū Samrah, Rmāḥ and al Khaznah, each sited at 10–15 kilometre intervals, and each provided with its own fields for cultivation. To the south, there have been attempts to achieve a deeper plan form than the conventional ribbon development, but rarely more than 25 kilometres across, since it is very expensive to build on the sands. More initiatives of this sort are likely to take place in the future, when expansion into the arid desert interior of the country will be required, and the cost of the necessary technology will have decreased.

There is a concern on the part of government to make these settlements more appealing by constructing the public buildings – such as markets, schools and mosques – first and then the residential buildings, roads and infrastructure. In other words, they want to provide the urban services available in any city without the hustle of the city centre, while major transactions and formalities can continue to be carried out in the main city centres, within commuting distance.

The more complex projects involve the removal of desert sands to create flat areas for building. The only way to sustain a built environment on the sand dunes would be to create impactments, otherwise development would have to be dispersed. Ideally, all the houses should be grouped together and roads conform to a standard width, which can only be achieved with a regular, repetitive grid system. So the process of levelling is very much designed to prepare specific areas of the land for urbanization, leaving the surrounding desert as it is; it is certainly not part of a policy of wholesale flattening of the desert. The aim is to use available financial resources

to develop desert areas in a way that was never possible before.

Some attempts have been made to create green forests, breaking the harshness of the environment, and the planting of trees along the main roads has been an important measure to safeguard against the encroachment of the sands. In the past, roads would have to be closed off when strong winds moved the sand. Planting also provides a safeguard against the sudden appearance on the main roads of camel caravans out of the desert which used to cause terrible accidents.

But beyond the roads, the desert is still very much in existence, and the need to protect the desert environment is recognized. One step that has been taken is the building of specially designed sheds in the desert, funded by the State, in which local citizens can keep their camels, so as to help maintain the way of life of the desert habitat. Cash subsidies are also granted to those who own livestock – cattle and sheep as well as camels – to encourage the continued inhabitation of the desert by animals. In addition, there are plans to provide backing for the traditional camel race events and tribal poets, in order to help conserve the original Bedouin lifestyle. Certainly, among the older and younger generation of shaykhs and the populace as a whole, the love of the desert has not changed.

The oases

The al 'Ayn Oasis project was initiated by Al 'Ayn Municipality and Town Planning Department, to rectify the neglect of the oasis when new housing was developed. Sadly the houses were planned with their primary façades facing onto the main streets, and their backs to the palm groves, when it should have been the other way round. As a result, no one is aware of the existence of the oasis, unless they actually go into it. In order to address this situation, we planned a new road leading to the palm groves, and also redesigned the internal walkway systems and upgraded the paving to ensure the safety of pedestrians. We couldn't extend the work much further, because the groves are private property, but we rebuilt the boundary walls to create a unified appearance in place of the chaos of planks, plywood, bricks, mud, concrete breeze-blocks, corrugated iron and so on which each owner had used in the past to build his own wall. Then we designed new gates to highlight the formal traditional entrances to the

oasis. The plan now is to landscape an area between the new road and the edge of the oasis, providing a formal threshold to the oasis. We hope that in future a new architecture of staggered and stepped buildings, responsive to the context of palm groves and trees, can be established here.

The master plan was prepared by Shankland Cox. The scheme included shaded areas for seating, including a small café on the edge of the square, and the renovation of the old mosques on the site. We suggested that they should be rebuilt in adobe, but this met with strong objections from the various parties concerned, and the issue became rather sensitive. The preliminary phase of the work started in 1988, followed by the first implementation phase three years later, although the actual execution only really started during the last five years and is still continuing.

Below

Narrow meandering pedestrian paths border the palm groves of al 'Ayn Oasis



We intend to repeat and build on this project at two more oases in the area: the Jīmī Oasis and the Qaṭṭārah Oasis. We wish to acknowledge the rôle of the oasis in the development of the city's morphology, beginning as it did as a complex of oases around which settlements developed. Gradually the oases became linked to each other, through the movement of people between them, and development began to expand westward towards the capital, Abu Dhabi. Expansion to the north and south, towards the mountains and to 'Ayn al Fāyḍah, then followed, while in the easterly direction the Sultanate of Oman provided a boundary.

The people who lived around the oases were known as the palm people, *ahl al nakhīl*, and the people of Abu Dhabi would come every year to spend the summer with them, to escape the humidity of the city. The running water of the *falaj* provided a cool and comfortable environment. But this traditional focal point of the city was quickly forgotten when new roads were built cutting through the city north–south and east–west, literally turning the developing town away from the palm groves when it should have been the reverse. The oasis at al 'Ayn is a remarkable feature, which is directly linked to other natural landmarks in the topography of the city and its environs: the Ḥafit mountain, and the wadis. (Wadī al 'Ayn runs into the oasis from the Sultanate of Oman, before dispersing, as does the Wadī al Sulaymī, while the Wadī al Tuwayyah defines the urban boundary of the town. They meet and spread out from the point of Siḥ al Miyā. So the oasis forges a special relationship between the mountain, the interior of the city, and the route out of it to the oasis of al Buraymī.) Despite the inherent value of this oasis, as a reference to the original town planning morphology of al 'Ayn and its environs, it is completely concealed by buildings, so that no one knows where it is located without consulting a map. This is a reflection on the reality forged by the intervention of modern development, accompanied by a lack of consideration for the nuances that generated the structure of the original fabric.



Above

The mosque of 'Ubayd bin 'Alī al Nāṣirī under renovation at al 'Ayn Oasis

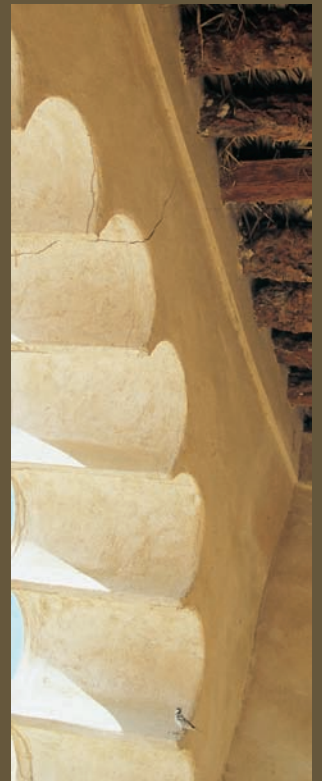
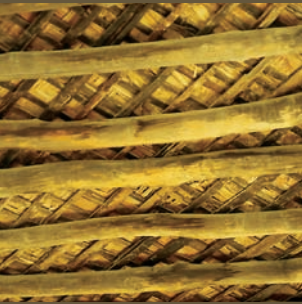
Opposite

The main square at the heart of al 'Ayn Oasis

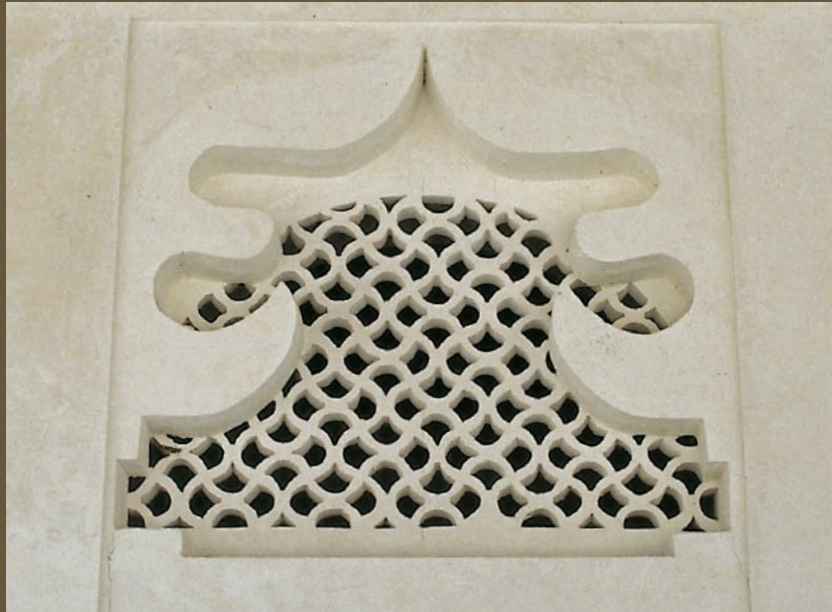
Opposite

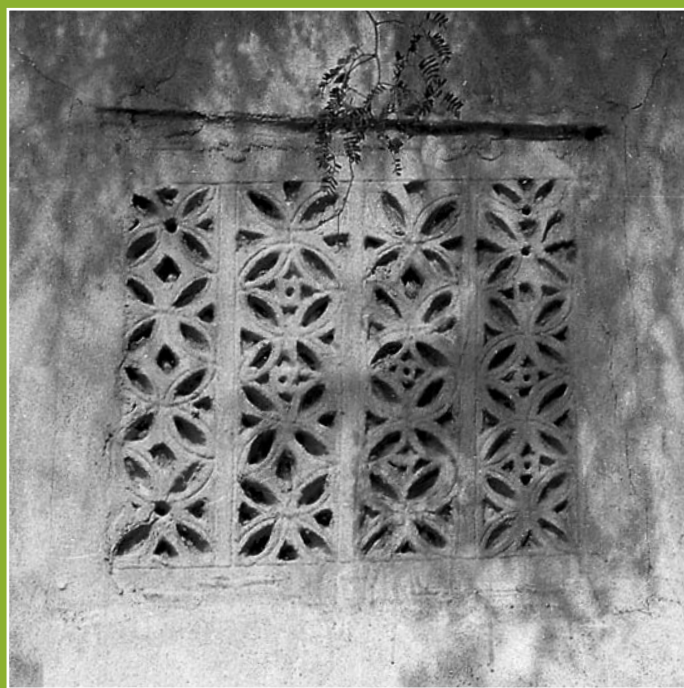
The main square at the heart of al 'Ayn Oasis





VERNACULAR Architecture





THE ISLAMIC ARCHITECTURE OF DALMĀ ISLAND

Geoffrey King

Dalmā Island lies in the western waters of Abu Dhabi Emirate, in the United Arab Emirates, 40 kilometres from the mainland at Jebel Dhannah and 80 kilometres from the east coast of Qatar.¹ Dalmā is one of the larger islands off the coast with barren mountains dominating much of the centre. The main town, also called Dalmā, is at the southern tip of the island where settlement has been established since the most ancient times, thanks to the presence of plentiful sweet water. The earliest site in this area is 'Ubayd-related,² while an Islamic graveyard just west of the town centre has pottery of *c.* sixth century AD date, fourteenth-century imports from Iran and China, and Late Islamic period pottery. Later Islamic pottery was also excavated in underlying structures during the restoration of the al Muraykhī mosque.

Dalmā is remarkable for the number of its extant traditional Islamic buildings. With a commercial building and three mosques all very close to each other in the centre of the old town, there is more traditional Islamic architecture extant in Dalmā town than anywhere else along the Abu Dhabi coast.

Before the fieldwork by the Abu Dhabi Islands Archaeological Survey (ADIAS) in 1992 from which the present account arises, the only research to have been reported was a short report that included comments on the archaeology of Dalmā by S. Cleuziou.³ This report

had only limited circulation, but it included ground plans and photographs of the buildings discussed here.

When these Dalmā buildings first were recorded in the course of the 1992 season of fieldwork by ADIAS, they were all dilapidated and their future survival was a matter of obvious doubt. As a result of the ADIAS report submitted in April 1992 to the Abu Dhabi authorities on our fieldwork, instructions were given for restoration of the traditional Islamic architecture of Dalmā which was undertaken in 1993–4 by Dr Abdul Sattar Al-Azzawi of the Sharjah Department of Antiquities. By this prompt action, the buildings discussed here have been preserved and protected as a part of the architectural heritage of Abu Dhabi and the UAE. In this account they are described as a matter of record as they were when we first studied them in 1992, i.e. before restoration.

The group of buildings as a whole is no older than a century and they may all be less. The only precise dating is provided by the foundation inscription in the al Muhannadi mosque which is dated to Shawwāl 1349/March 1931. There is also a graffito dating inscription in the Sa'id 'Alī al Qubaysī mosque of 1377/1946, which gives it a *terminus ante quem*. Local memory also suggests that the undated buildings (the Bayt al Muraykhī and al Muraykhī mosque) are of similar date to al Muhannadi mosque. However, the antiquity of the building traditions is very much greater.

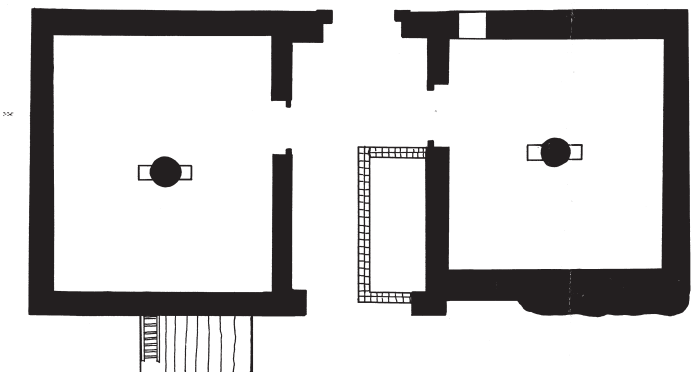
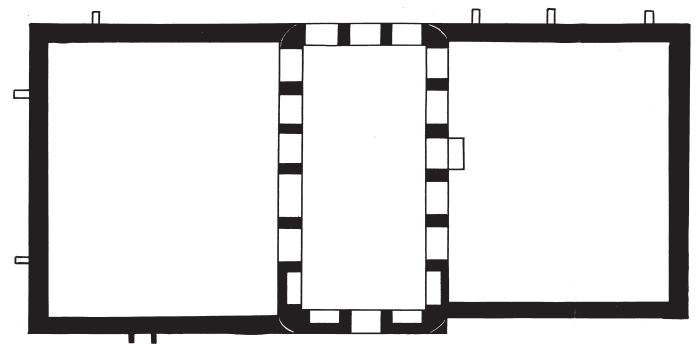
A merchant's building

Bayt al Muraykhī

The Bayt al Muraykhī is associated with al Muraykhī mosque just to its east. It stood in a garden amidst trees on a traffic island, close to the old shoreline, although this shoreline was masked by landfill by 1992. Like the mosque, it was built by Muḥammad bin Jāsim al Muraykhī, a member of a well-known family of the area who was engaged in the pearl trade, and the building was used as a secure commercial property. We were told that the building had been constructed by al Ḥuwāla Arab workers from the Iranian shore and the islands on the opposite side of the Gulf. It was constructed of beach-stone and plastered over with gypsum, which, in 1992, was turning a pinkish-white from its original pure white. During the recent restorations a date crush (*madbasah*) was excavated just to the north-east of the house but there was no trace whatever of this visible on the surface in 1992. The *madbasah* has now been completely rebuilt.

Bayt al Muraykhī had been designed as a secure commercial building with two strong windowless ground-floor rooms. Each room was entered through a single doorway from a central passage. Overall, the ground floor measured externally 17.55 x 8.14 metres and consisted of the two rooms to north and south of the passage. The south room internally measured 5.87 x 6.75 metres and the north room measured 6.02 x 6.28 metres. The central east–west passage between them measured 3.26 metres in width. These lower rooms of the house served as a local natural history museum until the late 1980s but this had fallen into disuse by 1992.

The upper storey of Bayt al Muraykhī consisted of two terraces to the north and south of an elegant central room. The terraces formed the roofing of the ground-floor secure rooms. The only access to this upper storey in 1992 was a wooden ladder fixed above a platform on the east side of the building, leading to the south terrace. The south terrace measured 6.75 x 7.66 metres and the north terrace measured 6.52 x 7.85 metres. These



Top

The trees surrounding the Bayt al Muraykhī, from the east

Middle

Bayt al Muraykhī: ground plan, lower floor

Bottom

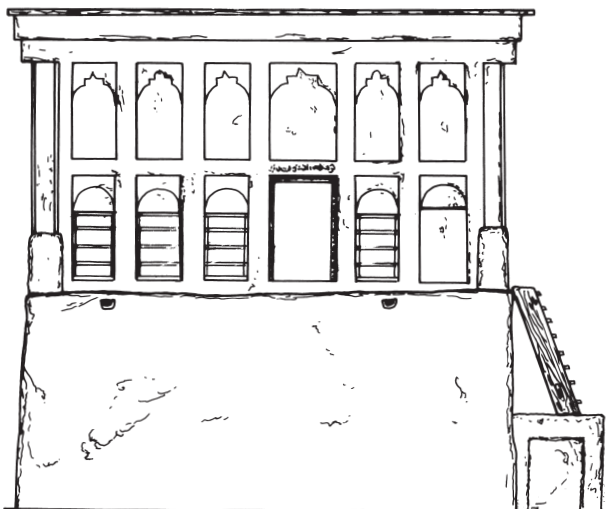
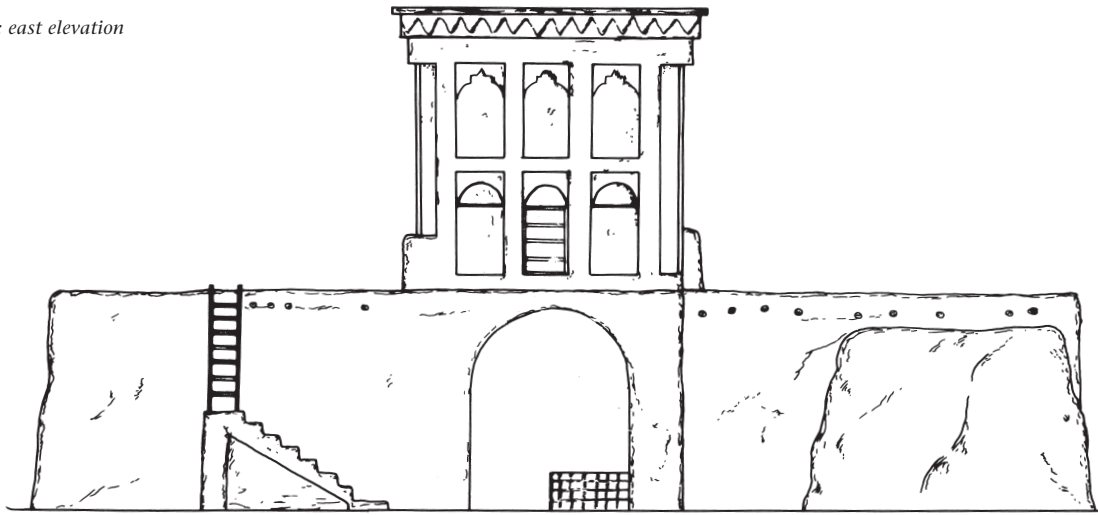
Ground plan, upper floor

Top
Bayt al Muraykhī: east elevation

Middle
West elevation

Bottom left
South elevation

Bottom right
North elevation



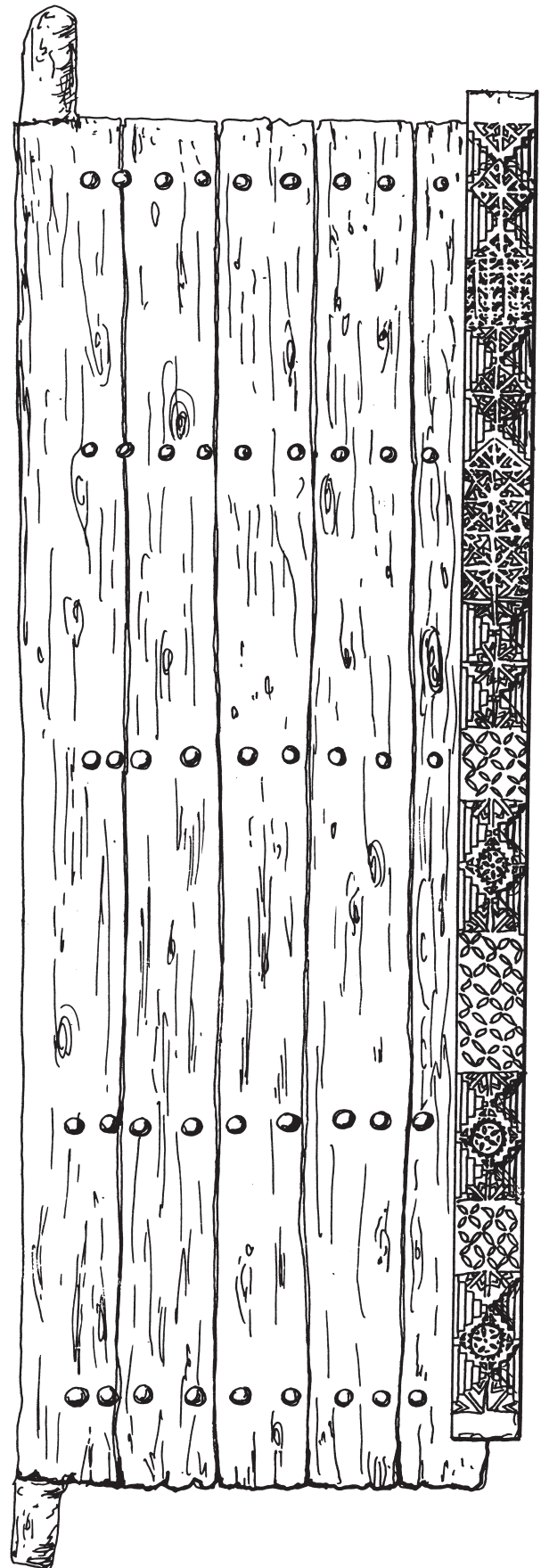
terraces were each surrounded by a low wall forming a balustrade, 40 centimetres wide. Both terraces were pitched to the west, so that rain water could flow off through four square wooden channels projecting about 30 centimetres from the building on that side. At the north-west corner of the northern roof terrace was an upright post, 36 x 39 centimetres in section and just under one metre high.

Between the terraces stood the central chamber, the only room on the upper floor. It lay on an east–west axis, directly above the ground-floor passage. It measured 7.02 x 3.28 metres and was built in the usual pier-and-panel system of construction found throughout the Gulf area. At the south-west and south-east external corners of the building were two quarter-pilasters on squared plinths. There were also corresponding pilasters at its north-east and north-west corners. It had windows, *bād gīr* (mid-wall windcatcher) and, above those, blind arches arranged in two registers, in the manner customary in buildings in the region. The chamber was made as cool as possible in the harsh summer by the numerous windows and the clustering of the *bād gīr* at the east end of the chamber. In cooler or windy weather, the wooden window shutters could be closed or the ventilator slots in the windcatchers could be shut off.

The south wall

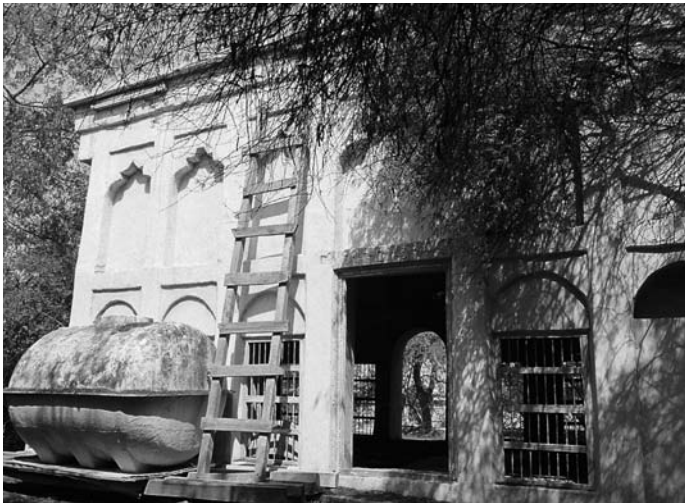
The main entrance leading into the chamber from the south terrace was preceded by a 10-centimetre high doorstep of beach-stone, 40 centimetres in width. The entrance had a round arch, corresponding in general form although wider than the rounded blind arches over the windows (see next page). The door had vanished but the door frame remained, measuring 1.90 x 1.20 metres. There were still some hinges in place and rust stains marked where others had vanished. The wooden lintel had a damaged inscription: '*sayakfiku-hum Allah wa buwa al Sami' al 'Alim*' (Qur'an: 'may God suffice them, the All-hearing, the Omniscient').

In the lower register of the south wall there were three identical rectangular windows at the west end. They were each surmounted by a blind round-headed arch set back 2–3 centimetres within a rectangular panel.



Above

Bayt al Muraykhi: door to the south storeroom on the ground floor



Above
The south side of the upper-floor chamber

These windows were subdivided by horizontal wooden cross pieces and there were eight vertical iron bars in each window, spaced 6 centimetres apart. The windows once had wooden shutters but all were missing. East of the entrance was a single window, identical to the three to the west, while in the final panel to the east was a *bād gīr*.

In the upper register was a rank of rectangular recesses containing blind broken arches with lobes. The arches were also set back 2–3 centimetres from their rectangular frames. The crowns of the arches were alternately either ogee or rounded. The blind arch with an ogee set over the entrance was wider than the other blind arches.

The eaves were set forward slightly from the rest of the wall on all four sides of the building. They were plain on all sides except at the east end, where there was a dogstooth motif in relief.

The north wall

The exterior surface of the north side of the chamber followed the same design as the south wall. The lower register consisted of rectangular windows measuring 1.21 x 0.76 metres, all set back around 7 centimetres from the surrounding frames. They were closed by the usual metal grilles and had round-headed blind arches in the register above. The design of the north wall differed from the south wall only in the location of the doorway

leading to the north terrace, which was placed centrally. The north entrance was of the same width as the flanking windows, in contrast to the larger main door on the south side.

The east and west walls

The exterior faces of the east and west walls of the upper storey were treated in a similar manner to the south and north walls. At the east end there was a *bād gīr* on either side of a central window, while at the west end of the building there were three windows in the lower register and no *bād gīr*. The upper register in each case consisted of blind broken arches crowned with ogees, flanking a broken lobed arch over the central window. The uppermost stretch of wall below the eaves had a dogstooth decorative motif in relief.

The interior

The interior surface of the south wall corresponded to the exterior with respect to the treatment of the windows, the *bād gīr* and the disposition of the blind panels in the upper register. The lower windows and the *bād gīr* were set back from the plane of the wall by 1–1.5 centimetres on the interior.

The uppermost part of the wall below the cavetto was terminated by a dogstooth moulding in raised relief



Above
Bayt al Muraykhi: ceiling corner decoration

in a similar manner to that on the exterior of the east wall. This dogstooth decoration below the cavetto ran around all of the uppermost part of the room. A triangular panel cut off each of the four corners of the ceiling above the cavetto (see below left). The triangular panels were decorated in relief although nowhere was the motif clear. Similar decorative plaster triangles are found in Bayt Jāsim b. ‘Abd al Wahhāb at Dārīn on the Saudi island of Tārūt.⁴

At the east end of the room were three ranks of recesses. In the lower rank in the centre was the rectangular window arrangement noted already in the account of the exterior. Each window was surmounted by a round lunette. To either side were the *bād gīr*, surmounted by blind round-headed arches. On the next level, above these blind arches, were rectangular panels. That in the centre had a lobed crown while there were ogees in the panels on either side. The interior surface of the west wall was identical to that of the east wall, except that there were windows rather than *bād gīr*.

The floor in the eastern part of the upper room was collapsing, partly because of repairs in cement carried out at a late date. It was here that the need for immediate restoration was most obvious in 1992 as the floor’s disintegration was imminent.

Bayt al Muraykhī and related structures

Bayt al Muraykhī pearl house appears to be the only commercial structure of this character to have been recorded anywhere in the Gulf. It combined the need for security for valuable merchandise, in this case pearls, with the provision of a fine room on the upper floor where the pearl-merchant al Muraykhī could conduct business in as cool an environment as the pre-modern Gulf could afford.

While parallels for the combination of strong rooms and the upper-floor chamber do not seem to survive elsewhere, the upper-floor chamber in itself has numerous extant parallels. In essence this is the standard pavilion-like chamber ubiquitous in the Gulf in the pre-modern period. The pier-and-panel construction method lends itself to the insertion of mid-wall wind-catchers (*bād gīrs*) and windows to admit the slightest

breeze, while simultaneously excluding sunlight with shutters, all essential in the oppressive humidity and heat of a Gulf summer.

Parallels for the upper chamber in terms of general appearance, design and ventilation systems and in the treatment of decoration are numerous, with very similar rooms in different contexts found in Qatar, Bahrain, Tārūt, al Qatīf and al Jubayl. A house in Wakra in Qatar is especially close in design, decoration, and the concentration of its *bād gīrs* within the building.⁵ A room in the Bayt ‘Abd al Wahhāb at Tārūt off the Saudi coast is also very similar.⁶ A modest house from al Jubayl in Saudi Arabia (now lost) is typical of the traditional houses of the region and shares the same pier-and-panel system that we see in the Bayt al Muraykhī. The Bayt al Mu’ayyad house on Bahrain (now lost) comprised a series of individual chambers of this type, in effect modules that together comprised a complex courtyard house.⁷

The broken lobed arches in Bayt al Muraykhī are identical to those in the Wakra house in Qatar and in the Bayt ‘Abd al Wahhāb at Tārūt, and are clearly a standard form throughout the region. The blind plaster grilles and blind panels and arches in these buildings are also ubiquitous throughout the area.

Finally, the roof structure is standard in design and in width everywhere in these buildings, whether secular or religious. The determining factor is the average length of the imported mangrove poles (around 3 metres) which, allowing 20–30 centimetres for the ends to rest on the walls of the structure, makes rooms and mosque aisles tend to be quite uniform in width at about 2.7–2.8 metres everywhere along the coast of Arabia, whenever mangrove poles are used.

The mosques

Al Muraykhī mosque

The al Muraykhī mosque lies east-north-east of the Bayt al Muraykhī and west of the old *sūq*, which was demolished some years ago.⁸ The National Bank of Abu Dhabi is 30 metres north of the mosque, standing where part of the old *sūq* used to be, while the sea used to reach to about 50 metres south of the mosque. The ground in this

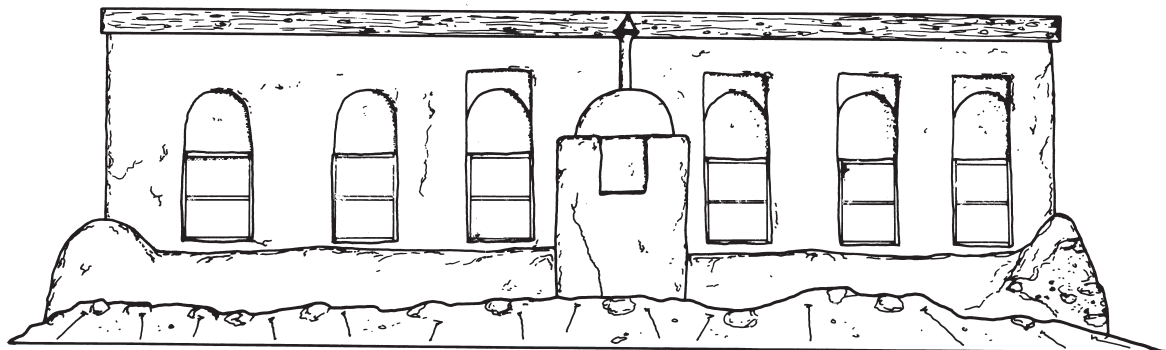
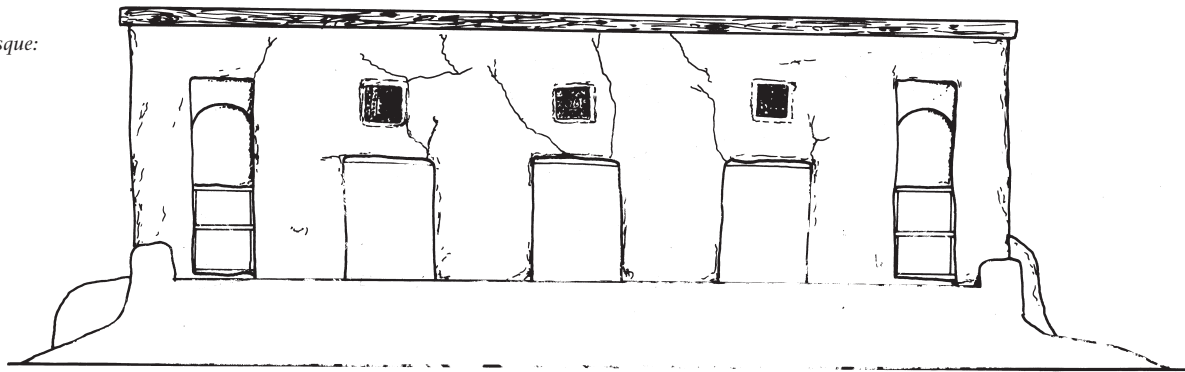
area is now very disturbed by modern landfill and the former beach has been obliterated. The al Muraykhī mosque was no longer in use when we first examined it in 1992.

It was built of beach-stone and in 1992 it was covered in gypsum plaster which was painted pale green on the exterior, while traces of plaster still survived on

Top
Al Muraykhī mosque:
east elevation

Middle
South elevation

Bottom
West elevation





Top left
Al Muraykhī mosque: the east side

Middle left
Interior looking south, with qiblah wall on right

Bottom left
Mihrāb and qiblah wall

Above
Qiblah wall

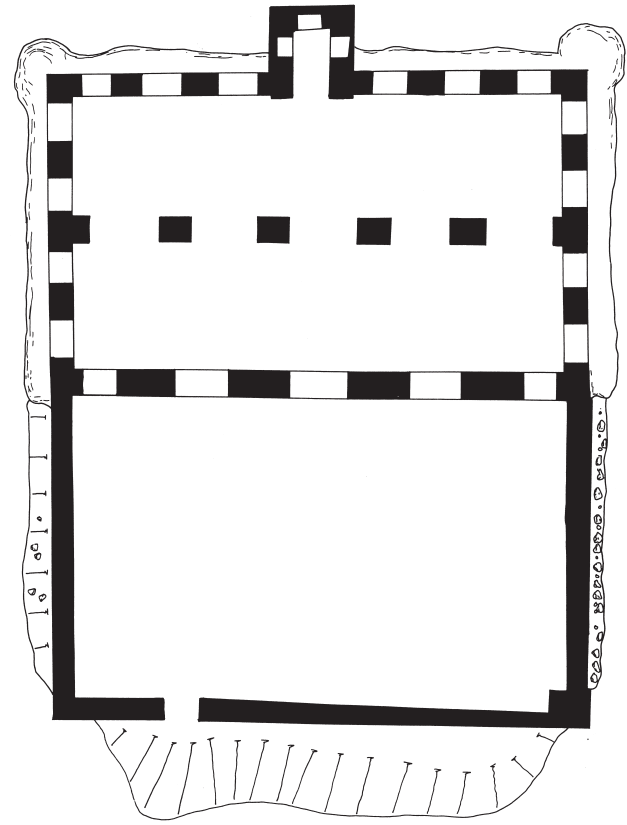
the interior. In recent times the mosque walls had been resurfaced in cement. Overall, the mosque measured 14.2 x 17.12 metres externally and it was oriented to 265° to *qiblah*. It had a roofed prayer hall on the western (*qiblah*) side, measuring internally 12.9 x 7.3 metres. The *ṣaḥn* (courtyard) on the east side of the prayer hall was 13.2 x 8.5 metres, defined by low walls painted red. These walls were built in segments and were rather irregular, varying in width between 55 and 60 centimetres. The north and south walls of the *ṣaḥn* aligned with the lateral walls of the prayer hall.

The entire structure, courtyard and prayer hall stood upon a beach-rock platform about 1 metre above present ground level. Along the north, south and west sides (excluding the *mīhrāb*) this platform revealed itself as a footing, built of beach-rock and concrete, projecting 45 centimetres from the line of the superstructure above, and painted red. The north-east, north-west and south-west corners were buttressed, the buttresses varying in height between 60–80 centimetres. This platform had the rôle of protecting the mosque against damp rising from the saline soil and it also served to cast off rain water.

The mosque enclosure was entered by a single entrance set at the southern end of the east wall of the courtyard. It was approached by a rough earth ramp in 1992 but there may have been a step here originally. The floor of the *ṣaḥn* was slightly lower than the level of the prayer-hall floor, and it was unpaved although some traces of plaster still covered the floor in the central area.

The courtyard was empty but for a rectangular prayer-call platform measuring 1.02 x 0.87 metres in the north-east corner, built against the *ṣaḥn* wall. This platform was slightly banked so that it was smaller in area at the top than at the base. Its manner of use as a place to call the prayer was demonstrated to me by a local man. It corresponded precisely to the position of a similar prayer-call platform in mosques II and III at Julfār (Ra's al Khaymah) which are dated to the fourteenth or fifteenth century.⁹

The prayer hall was entered from the *ṣaḥn* through one of three rectangular doorways in the east wall, the



Top
Al Muraykhī mosque: ground plan

Above right
Pillar in the prayer hall

Above left
Mihrāb

central one of which was on alignment with the *mīhrāb* in the west wall. These three entrances were all 1.4 metres wide. Although the prayer-hall entrances probably once had doors, there was no sign of them in 1992. The thresholds had all disintegrated and there were no door

fitments on the lintels. Above each of these entrances were square decorative blind grilles. The grille on alignment with the *miḥrāb* had a circular motif within the centre in the form of a star, differing in this from the simpler grilles over the two lateral doors.

Flanking these three doorways were two rectangular windows each with a wooden frame that held iron bars, set vertically, a feature typical of buildings throughout the Gulf.¹⁰ Above each window was a blind round-headed arch, corresponding to a similar recess on the interior.

The interior

The prayer hall measured 12.9 x 7.3 metres internally, with walls 65–73 centimetres thick. The interior was coated with gypsum plaster which was beige-pink but which originally had been white: there were some cement repairs. The interior was divided by a row of four rectangular piers into two aisles running parallel to the *qiblah* wall. The piers stood respectively 3.1–3.2 metres from the west wall and 3.21–3.25 metres from the east wall of the prayer hall. Surmounting the piers were stepped impost blocks forming simple capitals. Along with attached piers in the lateral walls these piers supported a system of wooden joists covered in plaster which would have carried the original roof.¹¹

The upper walls of the mosque interior and the superstructure above the piers terminated in a plaster cavetto, forming a continuous cornice running independently around the front (west) aisle of the mosque and again independently around the rear (east) aisle. The corners of the two rectangular roofing units to east and west of the colonnade were cut at each corner by a triangular decorative feature in plaster.

Above the cornice, the upper wall carried traces of the wooden beams of the original roof. It had been replaced by modern corrugated asbestos, work done by the Dalmā *baladiyāh* (municipality) before 1992. We were told that the original roofing beams had been imported from India.

Inside the mosque, there were four window units in each of the north and the south lateral walls, three to either side of the *miḥrāb* in the west (*qiblah*) wall, and one at the extremities of the east wall. All of the window units

were treated in a similar manner, with a rectangular window in the lower part with a wooden frame, partly closed by six vertical iron bars and a single wooden cross piece. In the upper part of each window unit was a blind round-headed arch set within a slightly raised rectangular frame.

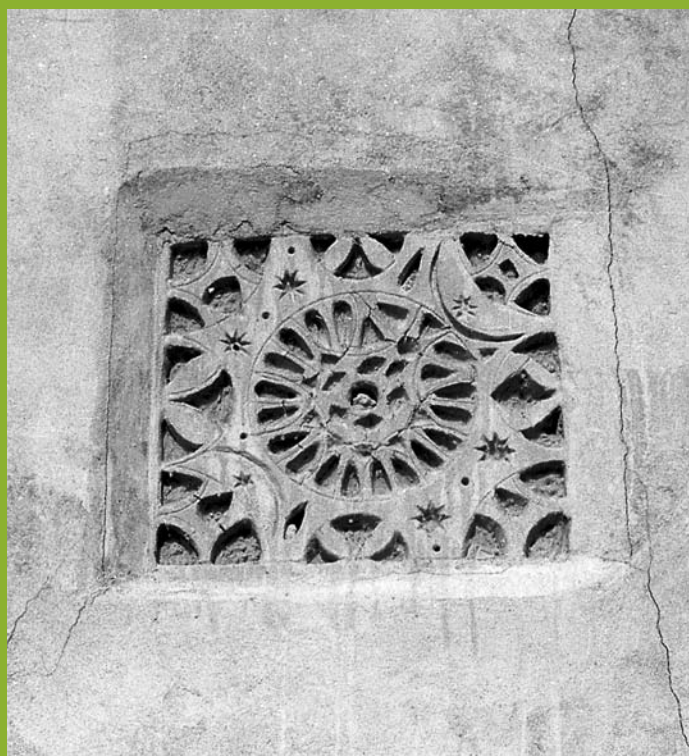
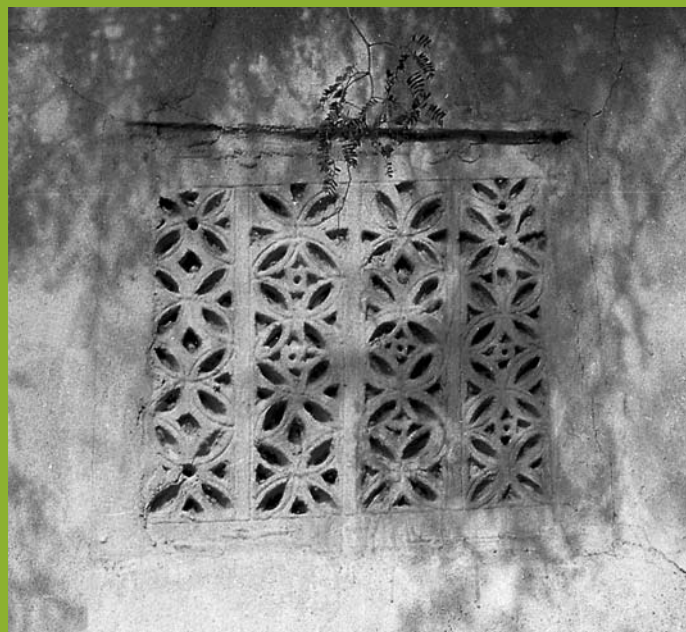
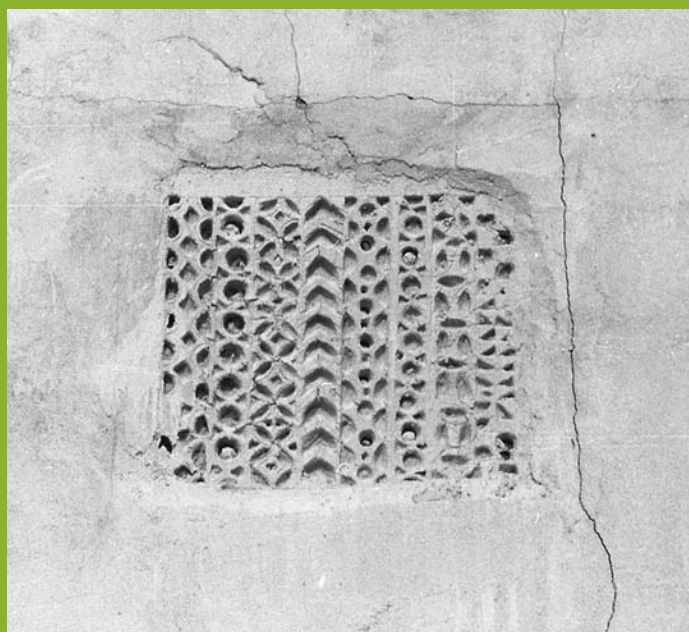
Treatment of the interior of the east wall differed: above each of the three doorways there were deep rectangular recesses, corresponding in their location to the decorative grilles on the exterior above the three doorways to the prayer hall.

The *miḥrāb*

The *qiblah* wall, as we have seen, had six windows in all, set in two ranks of three on either side of the central *miḥrāb* niche. This niche was rectangular in ground plan, measuring 1.55 x 2.21 metres externally. Seen from the exterior, the *miḥrāb* walls ran straight up from ground-surface level, without any of the buttressing that marked the footing of the other walls of the mosque.

The *miḥrāb* was covered by a barrel vault. At the outermost western edge of the barrel vault was a round column, about 1 metre high and 25 centimetres in diameter with a conical capping. This feature is unique in Arabian mosques as far as this writer is aware.¹²

The interior of the *miḥrāb* was covered in cement and grey-black pitch. The niche rose over half the full height of the *qiblah* wall. It had a *bād gīr* set in a rectangular recess in each of the south, west and north sides. These served to ventilate the *miḥrāb* interior and the forefront of the mosque. The *bād gīr* was constructed with a rear panel that sloped outwards and upwards, with a mid-wall open vent set horizontally. The dimensions of the western windcatcher approximated to those in the other two sides of the *miḥrāb*: it measured 1.07 x 0.05 metres and was set back 42 centimetres. It was 78 centimetres deep at the base, tapering to 72 centimetres at the level of the airvent slot which was 8.5 centimetres wide.



Top left

Al Muraykhī mosque: decorative geometric grille over the south door in the east wall

Above

Grille over the central door in the east wall. It is on an axis with the mihrāb

Top right

Grille over the north door in the east wall

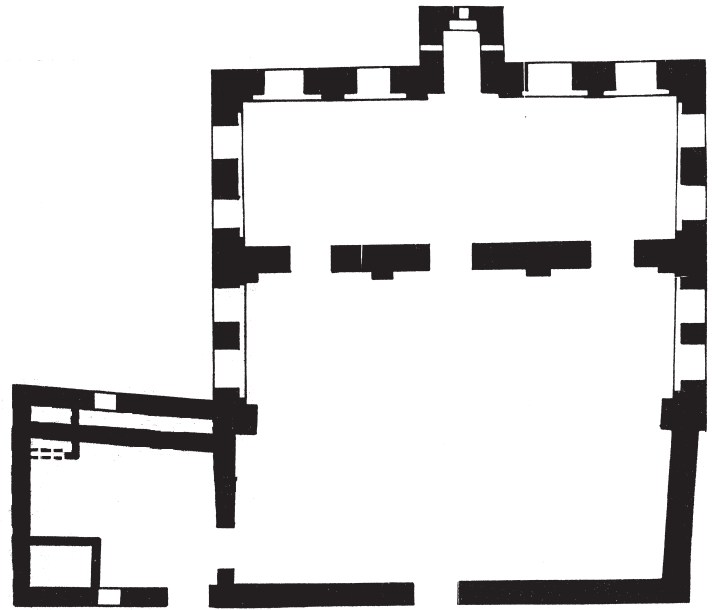
Right

Mihrāb

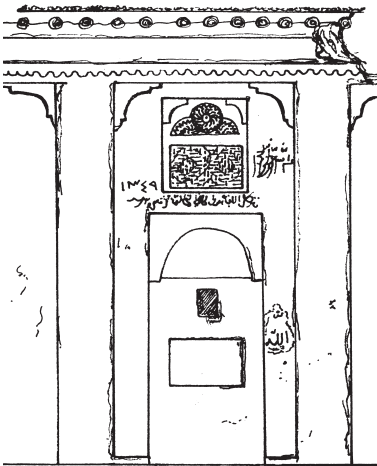
Al Muhannadi mosque

The mosque lay about 30 metres south of the National Bank of Abu Dhabi and to the north of the al Qubaysi mosque.¹³ When we saw it first in 1992, we were told it was called al Dawsari mosque, but during the restorations we were informed that it is correctly named al Muhannadi mosque.

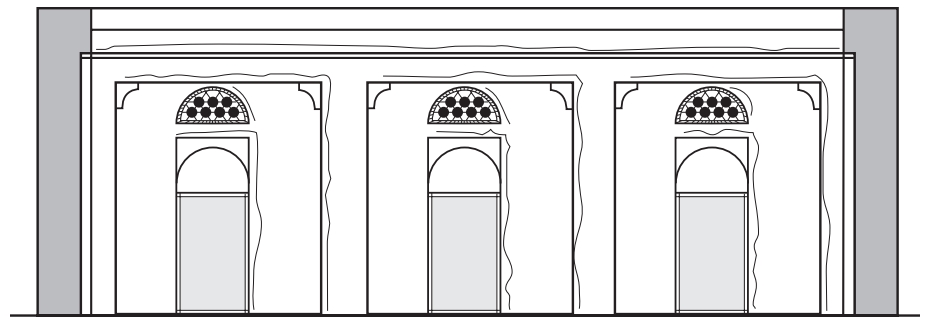
It was constructed of beach-rock and gypsum mortar, repaired with cement; the whole exterior was coated with white plaster. The mosque measured overall 12.82 x 11.62 metres externally and was oriented 266° to *qiblah*, and consisted of a shallow rectangular courtyard on the east side and a prayer hall fronted by a portico on the west (*qiblah*) side. Against the exterior of the courtyard on the south side was a *ḥammām*.



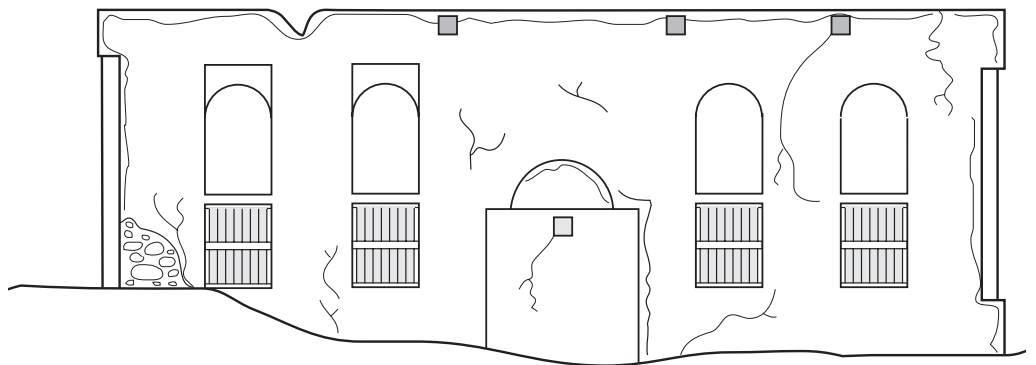
Above
Al Muhannadi mosque: ground plan



Above
Mihrāb and qiblah pillar in the prayer hall



Right top
East elevation



Right middle
West elevation



Right bottom
North elevation



Above top
Al Muhannadi mosque: the west (qiblah) wall from the north-west

Above middle
The courtyard and the portico, looking south

Above bottom
The courtyard and the east portico, looking north

Right top
The interior, looking north

Right middle
The interior, looking south

Right bottom
The roofing

The courtyard

The courtyard measured 4 x 11 metres, although it was difficult to distinguish it from the open portico in front of the prayer hall to the west as the space between the courtyard and the portico was continuous. On the other three sides, the courtyard was enclosed by a somewhat irregular low stone balustrade, like that of the al Muraykhī mosque. It was around 50 centimetres thick, 88 centimetres high, and coated in white plaster, although a recent cement skin covered parts of the wall. The lateral courtyard walls were not on line with the portico walls and the lateral walls of the prayer hall: they appeared to be a later addition along with the *ḥammām*.

There was a single entrance to the courtyard set slightly off-centre from the line of the central *miḥrāb* in the prayer hall. There was also access to the courtyard from the *ḥammām* through the south wall of the courtyard. The courtyard had a cement floor, as did the interior of the mosque.

The ḥammām

The *ḥammām*, which measured 5.3 x 5 metres, was built against the exterior of the south wall of the courtyard and abutted and cut into the eastern pilaster of the portico. The walls of the *ḥammām* were only 40 centimetres thick and were thinner (and probably later) than the courtyard walls. It had a corrugated asbestos roof but stubs of mangrove poles at ceiling height indicated the nature of an earlier roof. The *ḥammām* was being used for storage: as a result, the interior was largely obscured from view.

The portico

The portico measured 10.2 x 3.8 metres with lateral walls forming the continuation of the side walls of the prayer hall. The walls of the portico on either side were opened by rectangular windows, each with a wooden frame and a horizontal wooden cross piece. There were six vertical iron bars in each window. Each of these had four wooden shutters articulated with a very low relief in a rectangular frame.

Above the rectangular windows were slightly recessed rectangular panels in the portico walls. Set in each of these panels was a round-headed arch with a thin

parapet-like feature filling the lower half. Marking the eastern end of the portico were attached columns. The attached column on the south side was partly concealed by the *ḥammām* and there appeared to be an earlier circular column built within a square column.

In the portico area there formerly may have been one, or perhaps two, columns similar to the attached columns in the portico walls. However, in 1992 these had vanished. There were only plain, square posts in wood, supporting the roof, all modern.

The prayer hall

The prayer hall on the *qiblah* side was shallow, measuring 10.2 x 3.57 metres with a wall thickness of 60 centimetres. It had a flat roof constructed of mangrove poles and palm matting with reed mesh, covered by a gypsum plaster mortar. It was almost completely ruined when we first saw it in 1992.

On the exterior, at roof level on the *qiblah* side, were four rectangular holes in various degrees of disintegration which once held around one-metre long wooden drainage spouts to carry rain water from the roof of the mosque.

There were three doorways in the east wall from the courtyard, entered from the portico. Of these, one was nearly on axis with the central *miḥrāb* in the western (*qiblah*) wall, and the other two flanked it to either side. There were double doors in each entrance, each with a decorated cover-strip. The door designs appeared to differ from each other but they were badly weathered.

Above each of these three entrances was a blind round-headed arch, set back in a rectangular panel 6 centimetres from the plane of the wall surface. Above each of these three blind arches was yet another

Opposite

Top left

Al Muḥannadī mosque: door leaf in the east portico

Bottom left

Door leaf in the east portico

Top right

East wall and portico

Middle

Designs on Decorative plaster panels

Far right (top)

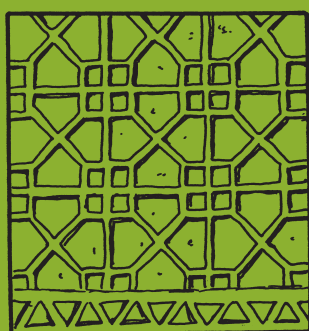
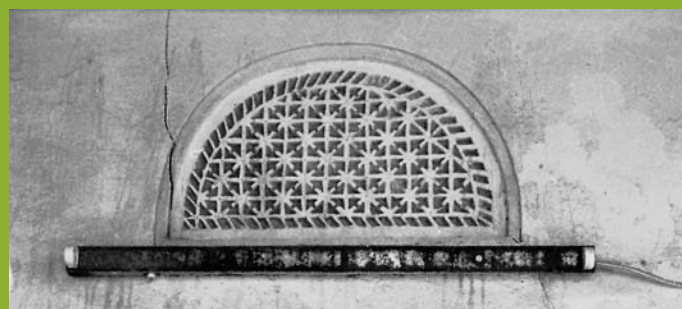
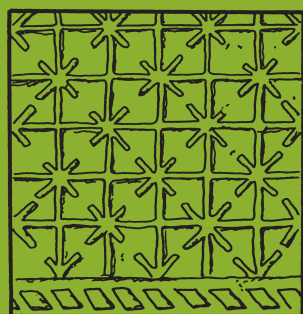
Decorative plaster lunette over the south door in the east wall

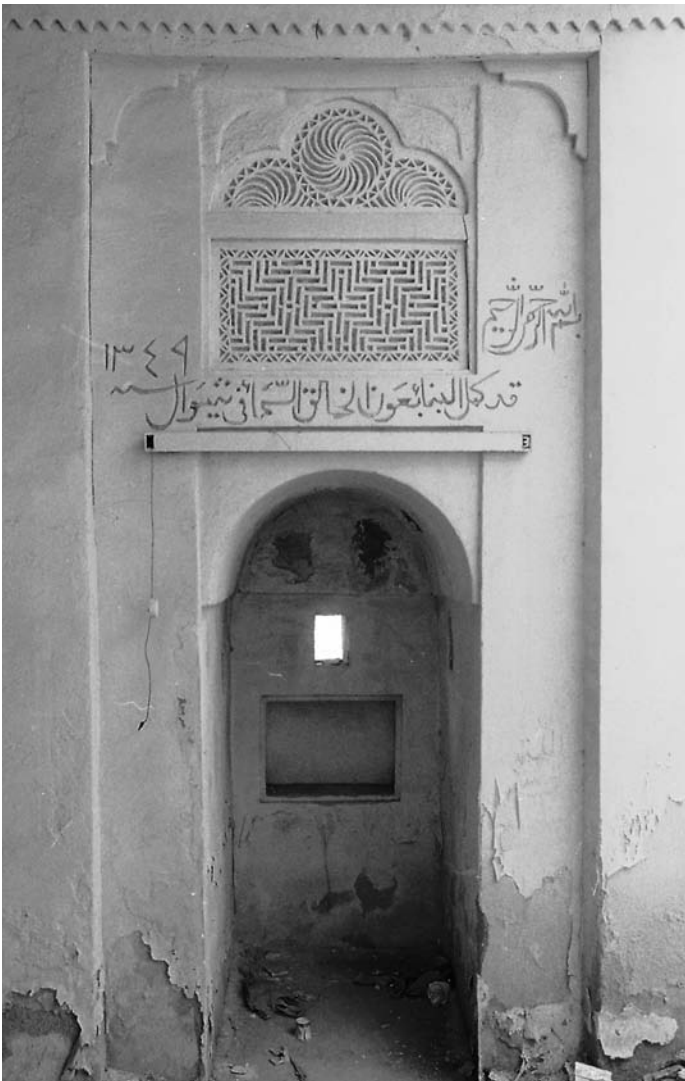
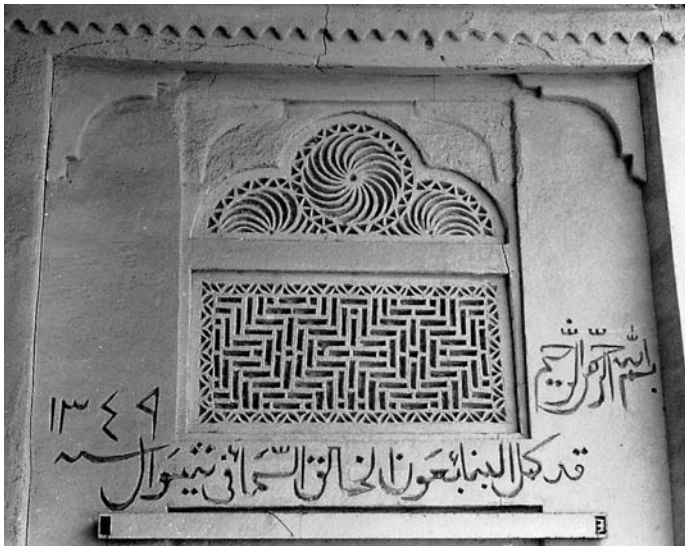
Far right (middle)

Decorative plaster lunette in the east wall over the central door

Far right (bottom)

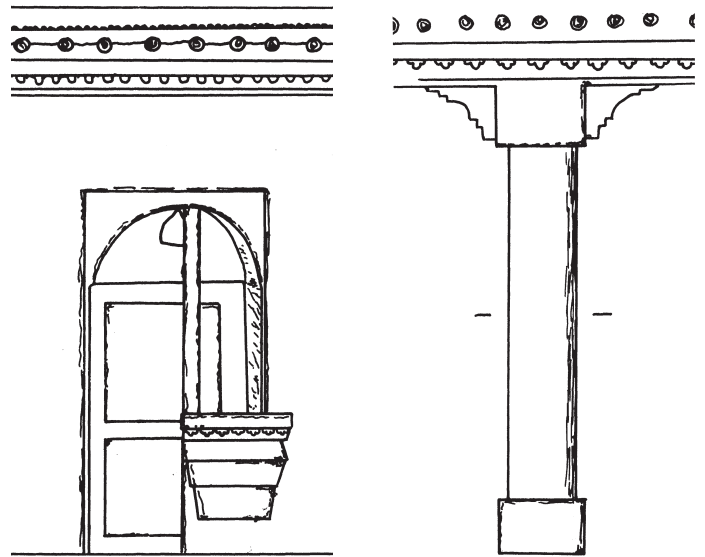
Decorative plaster lunette in the east wall over the north door





Top
Al Muhannadi mosque: decorative
plaster panels and inscription over
the mihrāb

Above
Mihrāb



Above
Mihrāb details

semi-circular arch, filled with decorative plaster grilles, all with different geometric designs.

There were two rectangular windows in each of the lateral walls, set 15 centimetres above floor level and with six vertical iron bars (but seven in the north-east window). The window units repeated the design already seen in the portico, the only difference being that the round-headed arches above these windows were blind, filled with thin panelling. Each window had four plain wooden shutters.

The single *mihrāb* in the centre of the *qiblah* wall was a large rectangular projection measuring 1.46 x 2.01 metres externally and 1.38 metres wide and 1.69 metres deep internally. It was roofed by a barrel vault, which sloped slightly down and away from the *qiblah* wall. There was a ledge at the point where the barrel vault sprang. In the upper part of the south, north and west sides of the *mihrāb*, there were small openings to light and ventilate its interior.

On the interior, the *mihrāb* was set in a rectangular recessed panel with moulded relief decoration in its corners. Within this recessed panel was yet another rectangular panel, with a deeply cut geometric grille. Above, there was a lobed arch with a whirling disc in the centre and a half version of the same motif on either side. The blind arch and panel with geometric plaster

decoration over the *miḥrāb* are similar to decorative plaster panels from Tārūt, Bahrain and Dubai.

On either side and below these decorative panels were incised inscriptions as follows:

Right: '*Bism Allāh al Raḥmān al Raḥīm*'.

(‘In the name of God the Merciful, the Compassionate’.)

Below: '*qad kamal al binā' bi 'awn al Khāliq al Samā' fi shawwāl sannat 1349*'.

(‘The building was completed with the help of the Creator of heaven in [the month of] Shawwāl of the year 1349 [March 1931]’.)

There was a niche for storing Qur’āns in the west side of the *miḥrāb*, measuring 60 x 44 x 24 centimetres, with a moulding frame around it.

Arranged on each side of the *miḥrāb* in the west (*qiblah*) wall were four window units in groups of two. These windows were slightly different from those already described. There were rectangular window frames in the lower rank, each with seven vertical iron window bars (as opposed to six in most of the side windows). Above each window was a blind round-headed arch which, on the south side, lacked the shallow recessed framing found on the lateral walls of the prayer-hall interior. However, there were faint traces of rectangular recesses around the two northern blind arches of the *qiblah* wall.

There were a number of blind niches, each 15 centimetres deep, set in the interior wall surfaces. There were two in the north wall, two in the south wall and two on either side of the *miḥrāb*. The upper wall terminated in a cavetto cornice running around all four walls. A zig-zag relief pattern in plaster also ran along the cornice of the north, south and west (*qiblah*) walls. The east wall alone had a cornice and no zig-zag relief.

On the exterior, at the point of junction of the *qiblah* wall with the north and south side walls of the prayer hall, there were attached quarter-columns. At the north-west corner, the ground had risen and the base of the quarter-column could not be seen, but at the south-west corner, where the ground was lower, the column was revealed clearly.

Sa'id 'Alī al Qubaysī mosque

Unlike the other two mosques described in this section, the Sa'id 'Alī al Qubaysī mosque was still in use in April 1992, with a largely South Asian congregation. Its name was recorded on a white marble plaque on the east side of the entrance. It was the largest mosque of the Dalmā group, measuring overall 21.8 x 17.57 metres and it was oriented 268° to *qiblah*. It consisted of a prayer hall on the west side fronted by a portico with an open courtyard to the east. There was a *ḥammām* at the south-east corner of the courtyard, outside the enclosure. The mosque was constructed of beach-rock and gypsum plaster and it was whitewashed inside and out. Cement repair at the bottom of the walls and portico columns was cracking off in sheets as a result of rising damp and salts. Whitewash and plaster was also peeling from the external walls.

The courtyard was surrounded by a low wall 50 centimetres thick with a coped top rising to a maximum height of 1.45 metres. The courtyard, measured internally, was 12.72 x 16.34 metres. There was a single entrance on the north side with plain wooden double doors. The courtyard was partly roofed with asbestos sheets resting on modern timber, and it had a cement floor which we assumed continued under the carpeting in the portico and into the prayer hall itself. There was a modern concrete platform standing 10 centimetres high in the courtyard and a breeze-block structure on the south side. There was also a wooden bier for funerals, in the courtyard.



Above

Sa'id 'Alī al Qubaysī mosque: the qiblah wall from the north-west



Above top
Sa'id 'Ali al Qubaysi mosque:
courtyard and east wall of the
prayer hall

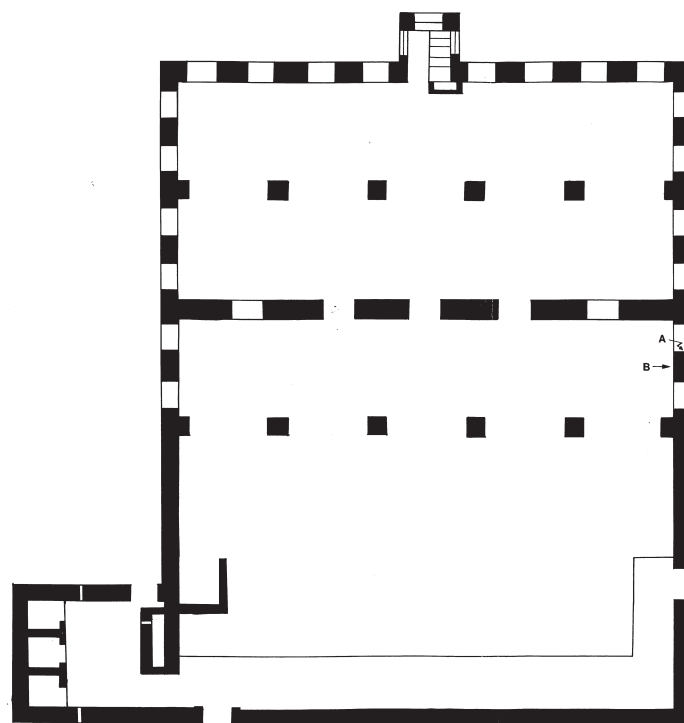
Above middle
The east wall of the prayer hall

Above
The interior of the prayer hall



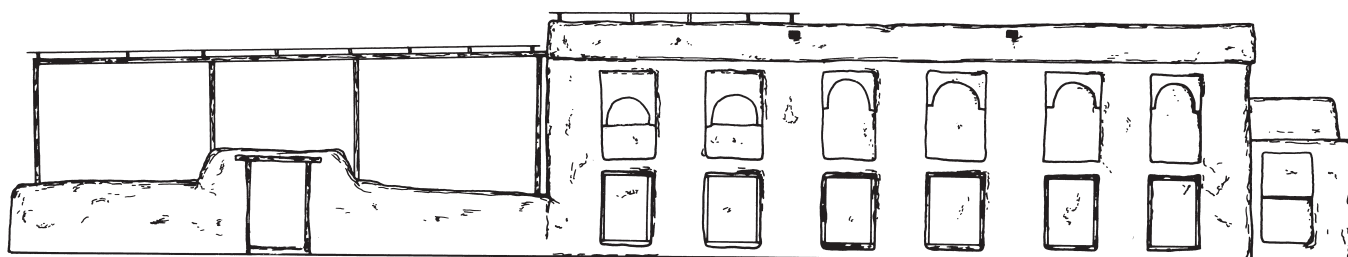
Right top
View north from the portico with the
east wall of the prayer hall on the
left

Right
The portico, looking north



Left
Sa'id 'Alī al Qubaysī mosque: the
east wall of the prayer hall, looking
north

Above
Ground plan



Right top
North elevation

Right middle
West elevation

Right bottom
East elevation

The portico

The open portico running along the west side of the courtyard and fronting the east façade of the prayer hall formed a natural continuation of the court. It consisted of two lateral walls (the north and south) bonded to the prayer hall and each measuring 3.9 metres. There were four octagonal columns running parallel to those inside the mosque, on a north–south axis. The column bases measured 60 x 60 centimetres, and they were set 2.66 metres from each other. At the east and west ends, both lateral walls were terminated by an attached column.

In each of these lateral stretches of wall there were two rectangular windows, both 1.46 metres high and between 93–95 centimetres wide. In 1992, they had wooden shutters which were closed and boarded up. Surmounting each window was a stilted round-headed arch set in a rectangular frame 54 centimetres high and 27 centimetres wide. The arches were recessed 37 centimetres within the wall thickness and were closed below by a panel 52 centimetres high. Thus, only the uppermost part of each arch was open.

Above the paired openings in the lateral walls, the plane of the wall was set forward 1.6 centimetres. Above this was a plain stretch of wall followed by a moulded cornice and an undulating moulding in relief.

On the short stretch of wall between the two windows on the north side of the portico were two lightly incised graffiti representing boats, carved into the smooth gypsum plaster of the mosque walls. The plaster was falling away and the two drawings were already fragile in 1992: since then they have both been lost. The incised boat motifs are discussed below.

The prayer hall

The prayer hall measured 16.3 x 7.15 metres. Its only access was from the east side where there were originally five doors, although those at the northern and southern extremity of the wall were no longer in use in 1992 and were boarded up. The entrances were all rectangular, measuring 1.08 metres in width. The central entrance had a double door with an elongated oval motif on each leaf, while the other doors lacked decoration, having only plain panels.¹⁴

Each entrance had a round-headed arch above it, forming a tympanum and set back 3 centimetres in a rectangular frame. Over the central entrance was a plaster grille with geometric decoration. Above the windows a raised line ran the width of the façade, followed by a plain stretch of wall above and then relief moulding forming an undulating line like that which appeared at this height in the lateral walls of the portico. The ends of the mangrove beams of the prayer-hall roof lay above the moulding. About 40 centimetres of wall had been added on the east side to support the modern wooden roof of the portico. This late roof replaced an earlier one that had rested on the octagonal columns and the lateral walls of the portico.

The interior of the prayer hall was divided by a row of four round columns into two aisles that ran north–south, parallel to the *qiblah* wall. They contrasted with the octagonal form of the columns in the portico, but their design corresponded to the half-columns built against the lateral walls of the portico.

The columns inside the prayer hall had a circumference of 1.54–1.55 metres and rested on square bases measuring 60 x 60 centimetres. The columns were set 2.65 metres apart from each other. They carried squared impost blocks with a moulded cavetto giving a capital-like effect. These impost blocks in turn bore joists disguised by plaster moulding.

The upper wall areas of the east and the west (*qiblah*) bays of the prayer hall had their own independent systems of cornices and raised undulating moulding like those already described in the portico. This independent treatment of the cornices in each bay was also seen in al Muraykhi mosque.

The roofing of the prayer hall was of traditional Gulf type with mangrove poles set at right angles to the *qiblah* across the joists. These poles supported a bamboo lattice (*basjil*, said to be imported from India) which in turn carried a thin mesh of palm matting.

The *mihrāb* recess in the al Qubaysi mosque was of particular interest. It was set in the centre of the *qiblah* wall, on line with the central door. It was rectangular in plan, forming a projection measuring 1.65 x 2.09 metres on the exterior and 1.38 x 1.69 metres internally. It was

roofed by a barrel vault. The niche was divided into two distinct elements, the *miḥrāb* proper to the left (south) and a fixed *minbar* (pulpit) built into the right (north) side of the niche. As a result, the *miḥrāb* was reduced to a width of a mere 77 centimetres with a thin wall dividing it from the *minbar*. An entrance from the *miḥrāb* led into the *minbar* which was 49 centimetres wide and which had four steps, ascending to a projecting rectangular pulpit whose front ledge projected 31.5 centimetres and which was stepped forward from the façade of the *qiblah* wall. This ledge was decorated with an undulating relief decoration and a cavetto recalling the decoration already noted beneath the ceiling of the prayer hall. The *minbar* cavetto also echoed that on the impost blocks of the columns.

The *miḥrāb-minbar* niche had a blocked air vent in the upper part of the west wall and a *bād gīr* lower down in each of its three sides: all were blocked.

In the *qiblah* wall on either side of the *miḥrāb* were two small shelves where incense had been burnt. There were also two flanking niches which were in fact blocked *bād gīr*; that to the south measured 0.93 x 1.42 metres while that to the north measured 0.94 x 1.37 metres. They were set back 44 centimetres from the interior wall plane. There was a total of six windows distributed in groups of three on either side of the *miḥrāb*. Each window measured 0.91 x 1.42 metres, set back 48 centimetres from the interior wall plane. Above each window was a round-headed arch, set back 27 centimetres. The windows and arches above were all set in shallow rectangular frames, 3 centimetres deep. Closing the windows were double-leaf wooden shutters.

The north wall and the south wall of the prayer hall had four windows of identical design to those in the *qiblah* wall, with blind arches above each one. The shelves provided by the windows and blind arches were used to store Qur'āns and Qur'ān stands.

The *ḥammām*

The *ḥammām* measured 4.5 x 4.8 metres externally and stood against the exterior of the south wall of the courtyard at its east end. It was entered from the courtyard or from the west, through a garden beside the mosque. The

original mangrove beams and palm-matting roofing were covered by a modern asbestos roof.

The incised drawings in the portico

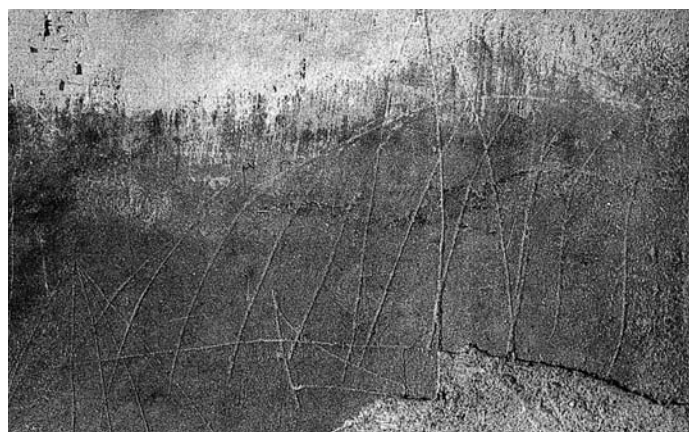
Boat drawings have a long history in the Gulf and those incised into the plaster in the north wall of the portico were a new addition to the repertoire of such pictures. They were also the first found in a mosque in the region.

The boats in the two drawings were shown side-on to the viewer but the nature of the plaster breakage was such that in neither case was any boat illustrated complete. In one (see next page), half of a hull and a sail were partly visible, but the vertical break of the plaster had sliced away the other end of the boat and its sail; in the other (see next page), two halves of separate hulls survived with two sails clearly visible, as well as rigging and perhaps a third sail. There were no human figures whatsoever.

The boat represented in the first picture consisted of a roughly sketched hull, rising at one end (presumably the stern). A triangular sail was cut off at its smaller end because of the plaster break. Five lines ran vertically across the sail. Two vertical lines marked rigging, running up to the vanished mast, cut by a vertical break in the plaster.

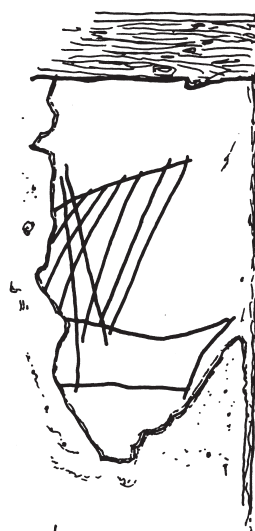
Whereas the drawing overleaf, top right, was cut vertically, the bottom right one was cut away horizontally and only the upper part of the picture survived. The boat on the right had a triangular sail intact with eight vertical lines which probably corresponded in shape to the incomplete sail in bottom right. It had a mast and two lines that seemed to indicate rigging.

The incised drawing to the extreme left seemed to show a boat of entirely different design, apparently sinking, although this interpretation is to assume that all was organized against the same horizon; if the boat was indeed going down, one end had reared up. The narrow midships area presented a rigidity of line that contrasted with the hull delineated in the picture top right. On the extreme end was a flag with an x-motif. On the top of the rigging was another long narrow flag, flying in the opposite direction, marked by a chequer pattern. A group of three lines forming a triangle may have been a sail but its continuation to the left was unclear. Incised in



the drawing was the date 1377/1946. The inscription may be later than the drawings or it may date them as a group.

There are number of similar boat representations elsewhere in the area. The earliest reported was found at Sirāf on the Iranian coast.¹⁵ It was from an upper room of a palace and was incised into the wall. The drawing showed a three-masted boat which David Whitehouse, the excavator, took to be of some size. He suggested that it should be regarded as eleventh century. (An incised illustration of a boat has also been noted at Kumzār in Musamdam by P. Costav.)



Far left
Sa'id 'Ali al Qubaysi mosque:
incised boat drawing (details)

Below left
Incised boat drawing

Left
Sketch of incised boat drawing

Below
Sketch of incised boat drawing



A group of boat drawings has been found cut into natural rock at Jabal al Jussasiya on the north-east coast of Qatar.¹⁶ These include boats in profile like those which we found in the Qubaysi mosque. W. Facey argues that the boat drawings at al Jussasiya should be dated to anywhere between 1600 and 1800, on the basis of ceramics found nearby. However, he also argues that the boat drawings could go back as early as the tenth century. The evidence of Sirāf at least demonstrates that the tradition of sketching contemporary boats goes back to around the eleventh century in this region. In the case of our incised drawings in the al Qubaysi mosque, they are late, given the likelihood that they are dated by the 1377/1946 graffito incised on the second drawing and the fact that the mosque is relatively recent.

Although late, these incised drawings are an interesting indication of the longevity of a Gulf tradition of boat representation in the Islamic period that has been noted only very infrequently.

The Dalmā mosques and the Arabian building tradition

The group of mosques at Dalmā is a significant addition to the limited list of older mosques extant in eastern Arabia and the Gulf. Among these, the heavily altered Juwātha mosque in al Ḥasā,¹⁷ an ‘Abbasīd mosque at Sirāf (c. 200–210/815–825)¹⁸ and a mosque at Sūq al Khamīs (740/1339–40) on Bahrain are the oldest known in the area.¹⁹ For later periods little has been published in detail, although along the eastern side of Arabia there are (or were) a number of old mosques extant until recent years. Thus, in Kuwait there are several mosques dating from between the late eighteenth and nineteenth centuries.²⁰ In eastern Saudi Arabia, in 1984, there were three mosques of traditional type in al Qaṭīf;²¹ three old mosques (all now demolished) at al Jubayl,²² and a rather diverse group inland at al Hufūf.²³ Several mosques have been recorded in Qaṭar, whose geographical proximity lends it particular importance for comparison with buildings on Dalmā.²⁴

Apart from the Dalmā mosques in Abu Dhabi Emirate, there are no extant mosques of any age along the whole of the UAE coast until one reaches the Emirate of Ra’s al Khaymah. Brief remarks were made on Ra’s al Khaymah by W. Dostal summarizing the broad characteristics of mosques at Jazīrt al Ḥamrā, Ra’s al Khaymah and at Rams.²⁵ At Julfār, Ra’s al Khaymah, a sequence of mosques dated from around the fourteenth to sixteenth centuries has been excavated by a British team directed by the present writer.²⁶ Several traditional mosques are found elsewhere in Ra’s al Khaymah, notably at Jazīrt al Ḥamrā and at al Falayyah. Further north in Oman at al Bukhā’ on the Musandam Peninsula is a well-preserved mosque,²⁷ while a very distinctive mosque survives at al Bidiya in the Emirate of Fujairah on the eastern side of the UAE.²⁸ However, this is a widely scattered body of diverse material, whereas the Dalmā group of mosques is marked by its cohesion of design and decoration as well as its concentration in one place.

While they vary in size, the Dalmā mosques all conform to a similar plan and distribution of their principal elements. Like the Bayt al Muraykhī, they all follow the pier-and-panel construction method found in much of Arabian coastal architecture and the architecture of the Indian Ocean littoral. Also like the architecture of coastal Arabia generally, their design is characterized by the extreme openness of the walls with the numerous windows supplemented by *bād gīr* to ventilate the interior in the hot, humid summer months. The Dalmā mosques also provide a point of departure for more general statements about the religious architecture of the region.

The absence of a minaret

In no instance at Dalmā is there a minaret in the sense of a tower, nor is there a staircase to the roof of any of the prayer halls, in contradistinction to mosques of Sirāf,²⁹ al Jubayl³⁰ or Najd generally, where a roof staircase is common.³¹

When we first saw the al Muraykhī mosque in 1992, there was a prayer-call platform in the north-east corner of the courtyard of the mosque, built as one with the courtyard wall and to the height of the surrounding wall. It was removed in error during the restorations of 1994. It was intended as a raised position whence to call the prayer and this explanation coincides with the rôle ascribed to such platforms elsewhere in Arabia. Furthermore, its location – on the right-hand side from the main entrance – corresponds to the position of similar prayer-call platforms in mosques elsewhere in the UAE and in Arabia.

The longevity of the prayer-call platform tradition is hard to assess at present. The earliest recorded so far seems to be that already mentioned, made of sand-brick and found in mosques II and III at Julfār, probably of the fourteenth or fifteenth century. Its position corresponded to that of the platform in the al Muraykhī mosque.

Elsewhere in the area, a similar platform occurs in the mosque at al Falayya, just outside Ra's al Khaymah and presumably of relatively late date. The evidence of the al Muraykhī mosque, Julfār mosques II and III and the al Falayya mosque suggests that the prayer-call platform of similar dimensions, and in this specific location in the mosque courtyard, was a feature of Gulf mosques from at least the fourteenth–fifteenth centuries.

Such prayer-call platforms are by no means confined to the Gulf. They are relatively widespread in Arabia and are often to the right of a mosque's main entrance. Examples occur in places as widely scattered as the Asfal mosque at Masqī in the highlands of 'Asīr,³² the 'Abbās mosque in Abū'l 'Arīsh³³ and the mosque of al Birk, the latter two on the Tihāma coast of Saudi Arabia on the Red Sea.³⁴

There are also numerous Arabian and Gulf mosques without a tower minaret of any sort. These include the two earliest Arabian mosques so far excavated at al Rabadha, near Madina and dated to around the eighth century and the ninth or tenth century.³⁵ The small mosques at Sirāf on the Iranian coast of the Gulf of the ninth to twelfth century also lacked minarets.³⁶ G. S. P. Freeman-Grenville points out the extreme rarity of minaret towers in East Africa before the late nineteenth century, and notes the presence of an 'external staircase, sometimes part of the structure of the ablutions, from which the call to prayer was given':³⁷ what he describes matches closely the situation in Arabia, especially in the south-west and the Gulf, and to this degree it seems reasonable to see the paucity of minarets on the east African coast as being an echo of the Arabian tradition.

One assumes that this tradition of excluding a minaret or replacing it with a platform is a conservative adherence to some little-known practice, preserved now mainly in Arabia and in East Africa, whose own architectural traditions generally reflect its close relationship with Arabian religious architecture.

It is erroneous to associate the platform minaret or the absence of a tower minaret with particular Islamic groups. Thus, while Ibāḍī mosques in south-east Arabia lack minarets, mosques in non-Ibāḍī areas may also have no minarets. Nor is the inspiration derived from

Wahhabism as has sometimes been suggested: platform minarets occur in areas which are not Wahhābī and have never been so, while there is no shortage of tower minarets in areas which are associated with the Wahhābīs. Most persuasive in this latter respect is the absence of a minaret tower and the presence of a prayer-call platform in the Julfār mosque, dated to no later than the fifteenth century, as we have seen. This makes it quite clear that the Arabian mosque with a prayer-call platform long precedes the Wahhābī doctrines of the mid-eighteenth century. Instead, it seems reasonable to suspect that the tradition of dispensing with a minaret tower is seated deeply in Arabia's little-known architectural past. It will not be possible to draw any firm conclusion on the origin and antiquity of such platforms until more archaeological evidence emerges on the design of other early Arabian mosques.

Prayer halls of the Dalmā mosques

Entry to all three Dalmā mosques is solely through the courtyard which gives access to the prayer hall. There are no entrances directly from the exterior to the prayer halls. However, in both the al Qubaysī mosque and the small al Muhannadī mosque, it is possible to enter the courtyard through the *ḥammām*.

In the al Muraykhī mosque, the entrance to the courtyard was offset to the south end of the east wall. While the al Qubaysī mosque had an entrance in a corresponding position beside the *ḥammām*, it alone among these mosques had an entrance in the north side of the courtyard. Only the al Muhannadī mosque had its main entrance more or less centrally placed on axis with the *miḥrāb*.

Both the large al Qubaysī mosque and the small al Muhannadī mosque had a portico on the courtyard side, fronting their prayer halls. In both cases the porticoes had flanking walls opened by paired windows. In the case of the al Qubaysī mosque, columns supporting the portico roof bordered the courtyard. The portico roofing of the al Muhannadī mosque was also probably once supported by columns but by 1992 these had been replaced. The same portico arrangement in these two Dalmā mosques was found in a mosque at al Khawr north of Doha in

Qatar, dated 1373/1953–4,³⁸ and in the al Khalifa mosque and the al Dayj mosque in Kuwait.³⁹ More broadly, one is reminded of the porticoes that front Ottoman mosques and where prayer often takes place when the prayer hall is closed.

The interiors of the prayer halls are similarly treated in al Muraykhī mosque and al Qubaysī mosque, with a single colonnade in each case running parallel to the *qiblah* wall. This ordering of the interior is encountered throughout the region. This was the case in the oldest mosques in the area, the northern mosque of about the eighth century at al Rabadha, the ‘Abbasid mosque at Sirāf of about 200–210/815–825,⁴⁰ in the Juwātha mosque in al Ḥasā’, the Sūq al Khamīs mosque in Bahrain, and the al Jabrī mosque of 820/1417 in al Ḥufūf.⁴¹ The same design was followed, as far as one can estimate from foundations, in mosques III, IV and V at Julfār (fourteenth to sixteenth centuries).⁴² In later mosques in Saudi Arabia, the UAE and Oman a similar design was followed, including the lost mosques of al Jubayl in Saudi Arabia, the mosque at al Falayya in Ra’s al Khaymah,⁴³ the mosque at Jazīrt al Ḥamrā in Ra’s al Khaymah, and the Great Mosque of al Bukhā’ in the Musandam Peninsula in northern Oman, just north of the Ra’s al Khaymah border.⁴⁴

The *miḥrābs*

Although the three Dalmā mosques all have one of the three doors to the prayer hall on line with the *miḥrāb*, the space between the colonnades in front of the *miḥrāb* is no greater than the span between other colonnades, so that there is no special emphasis in the ground plan on the *miḥrāb* axis. In this respect, these mosques correspond to the arrangement of those at al Khawr in Qatar, in the Jazīrt al Ḥamrā mosque in Ra’s al Khaymah, in the sequence of mosques at Julfār, and in the Great Mosque of al Bukhā’ in Musandam. Quite lacking at Dalmā is the axial emphasis on the *miḥrāb* achieved by additional decoration and greater width of colonnading on the *qiblah* axis, such as that encountered in the old *jāmi‘* (Friday mosque) at al Jubayl, or the al Jabrī mosque at al Ḥufūf.⁴⁵

The *miḥrāb* niches of the three mosques at Dalmā are all differently treated. It is common in Arabia for

miḥrābs to form very large recesses marked by a correspondingly large projection on the exterior of the *qiblah* wall. The ground plans of the Dalmā *miḥrābs* consistently form a rectangular projection.

The *miḥrāb* of al Qubaysī mosque is the only one of the group to have a *minbar* built into it. It was designed as a Friday mosque, a fact reflected in its greater size compared with the other mosques. The fixed *minbar* built into the right-hand part of the recess (facing) with the *miḥrāb* on the left is commonly encountered in Arabian mosques, although this arrangement has not been identified in any Peninsula mosques of early date. However, such *miḥrābs* and *minbars* appear elsewhere in the UAE. The mosque at al Falayya in Ra’s al Khaymah has a fixed *minbar* filling the right-hand half of the niche that houses the *miḥrāb*. The mosque at al Bidiya in Fujairah has a fixed *minbar* projecting from the *qiblah* wall, a variation on the theme described above.⁴⁶ This same *minbar* type also occurs in the sixteenth-century Ibrāhīm Pasha mosque in al Ḥufūf in Saudi Arabia, where a fixed *minbar* to the right of the *miḥrāb* projects from the *qiblah* wall.⁴⁷ Further afield in western and northern Arabia, fixed *minbars* inside or next to *miḥrābs* are quite widespread. They occur in the al Shāfi mosque in Jidda,⁴⁸ the mosque at al Muwayliḥ on the northern Ḥijāz coast, at Dūmat al Jandal in northern Najd in the post-1793–4 rebuilding of the mosque of ‘Umar prayer hall⁴⁹ and in the Friday mosque at Sudūs north of al Riyāḍ in central Najd.⁵⁰ Outside Arabia, the fixed *minbar* was recorded by J. Schacht in East Africa where mosque design has much in common with Arabian architectural traditions, as we have already seen.⁵¹

The *miḥrābs* of al Muraykhī mosque and of the al Muhannadi mosque are quite different. Both are distinguished by their decoration: the accentuation of a *miḥrāb* by decoration is a long-standing feature of the Islamic architectural tradition. The al Muraykhī mosque recalls the treatment of *miḥrābs* in Iraq and Iran, the succession of rectangular decorative frames around the *miḥrāb* niche being a design of considerable antiquity in Islamic architecture. Such rectangular frames developed in the Islamic east at an early date, and thereafter became a staple feature of eastern Islamic architecture.

The deep recesses of all three *miḥrābs* at the Dalmā mosques are very similar to each other, with their square ground plans and their barrel-vaulted roofing. The mosque of al Muraykhī alone is distinguished by the curious column stub that surmounts the barrel vault. This writer is not aware of any parallels for such a feature among the mosques of the Arabian coast or interior.

The *miḥrāb* of the al Muhannadī mosque is accentuated by the use of decorative plaster screens of a type that belong to the repertoire of pierced plaster screens that are commonly found in Gulf architecture. The panels above the *miḥrāb* of the al Muhannadī mosque are distinguished from others in the building by their greater complexity and the foundation inscription. This accentuation of the *miḥrāb* is a feature common in mosque architecture generally but here it is executed entirely in terms of Gulf decorative traditions.

In the al Muraykhī and the al Qubaysī mosques the *miḥrāb* interiors are ventilated with *bād gīrs*, a practical response to the oppressive summer climate and a necessary relief for the individual leading prayers and those at the front of the mosque. The *miḥrāb* projection has the effect of providing three separate surfaces to benefit from whatever breeze strikes the *miḥrāb*, whether from the north, west or south. This writer is unaware of this use of the *bād gīr* elsewhere.

Ablution facilities

In both the al Qubaysī mosque and the al Muhannadī mosque, the ablution facilities are located against the exterior of the south wall at the east end. During restoration of the al Muraykhī mosque by the Sharjah Department of Antiquities in 1994, wall foundations exposed in the same relative location by the restorers suggested to them a similar ablution facility which they proceeded to build to what they assessed as its original height. There had been no sign of this *ḥammām* at surface level in 1992.

The location of ablution facilities is a subject that has not been properly researched in the study of mosques generally and it is hard to make any broad comment on the basis of the Dalmā mosques. However, the consistency of the *ḥammām* location in the al

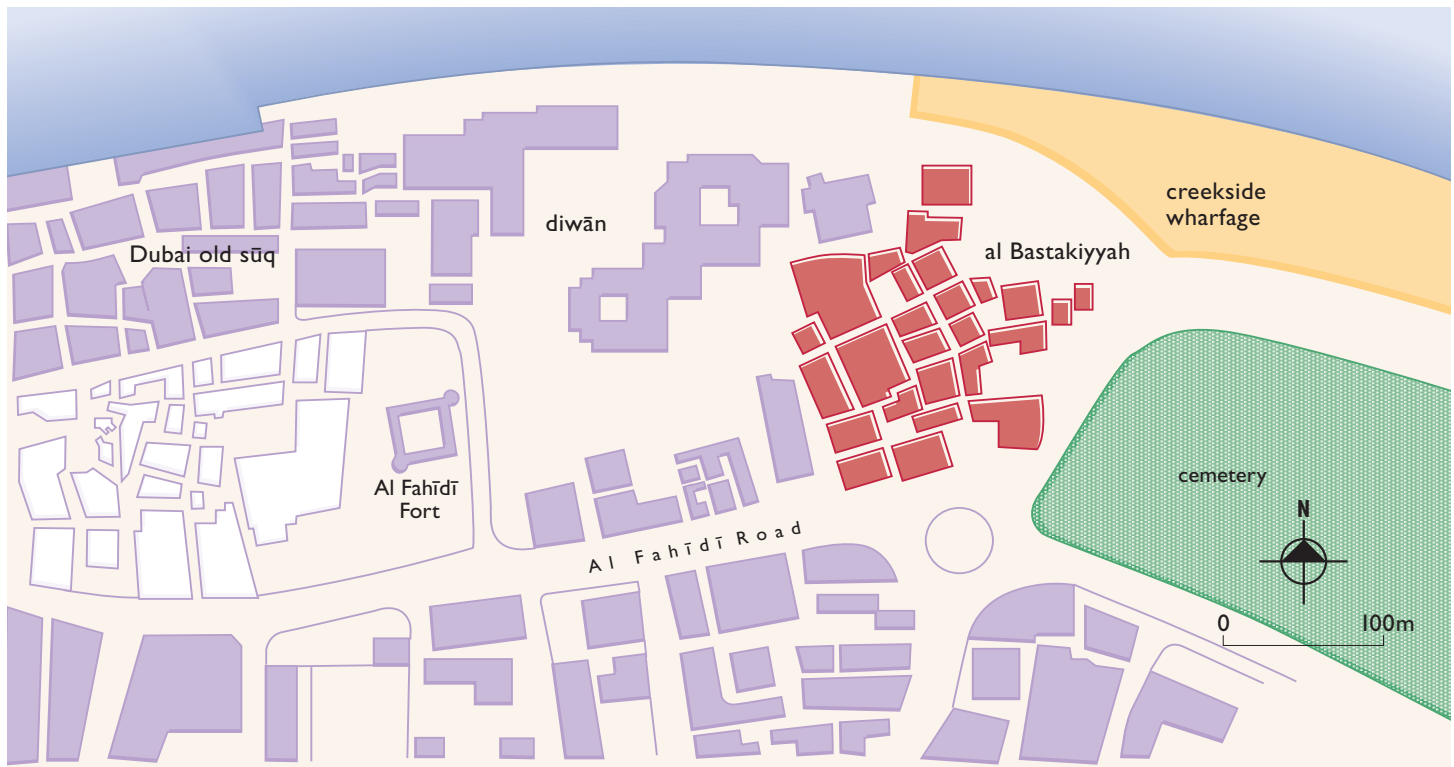
Muhannadī and the al Qubaysī mosques is of interest. The position conforms with the need to provide ablution facilities adjacent to the mosque, separate from but close to the enclosure, and placed as far as possible from the *qiblah* wall. The location of the *ḥammām* to the left of the entrance to the courtyard may be a matter of some note, given the negative associations of the left hand.

Throughout the Gulf countries, the ever-increasing pace of modernization has been accompanied by the loss of the fragile architecture of earlier centuries, and this has been as much the case in the UAE as elsewhere in the region. Piety tends to ensure that mosques are among the first buildings to be modernized or rebuilt, while property values and a desire for the comforts of modernity equally rapidly lead to the rebuilding of traditional structures like the Bayt al Muraykhī. As a result, decreasing numbers of old houses and mosques survive in Arabia as a whole and it is rare now in the Gulf to find extant a group of traditional buildings like those in Dalmā, related closely in date and style. This loss underlines the importance of the survival of these Islamic vernacular buildings on the island. The survival of a distinctive and related group of late-Islamic buildings at Dalmā is fortunate and their conservation in 1993–4 is especially welcome, providing as they do rare evidence of the architectural traditions of Abu Dhabi Emirate in the past and their relationship with Gulf architecture as a whole.



THE URBAN ARCHITECTURE OF AL BASTAKIYYAH

Keith Olroyd-Robinson



The district of al Bastakiyyah in Dubai lies on the southern side of the creek, to the east of the old *sūq* as shown above. Al Bastakiyyah is the last coherent group of traditional buildings and windtower houses in the United Arab Emirates; other comparable sites have been overtaken by modern development and are now less significant and complete than al Bastakiyyah. Although not very old, the remaining group of houses at al Bastakiyyah reflects the long trading history of Dubai and forms a magnificent urban and architectural ensemble in total contrast to the modern city.

As with all rapidly expanding cities, Dubai's growth has meant the loss of historic buildings and traditions. However, under the guidance of Shaykh Rāshid bin Sa'īd Āl Maktūm, the first town plan in 1958 for Dubai, prepared by John R. Harris Architects, allowed for the preservation of al Bastakiyyah. A major review of the town plan was undertaken in 1971, again by John R. Harris Architects which included a survey of old buildings worthy of preservation and restoration. As part of that survey a monograph was published on al Bastakiyyah entitled *A Windtower House in Dubai* by

Alison Coles and Peter Jackson. Since the 1980s the Dubai Municipality has attached increasing importance to the conservation of the architectural heritage of the city and its surrounding areas, and its Archaeological Buildings Restoration Unit was established in 1991. In

the first phase of the conservation programme in al Bastakiyyah this writer was appointed as the consultant to carry out a survey of the buildings, study the architectural planning and propose a work programme for the restoration of the area.

The history of Dubai

Dubai lies towards the eastern end of the Gulf, on one of the world's oldest trading routes. In the past, fishing and the pearl trade supplemented date palm cultivation as the main economic activity. Archaeological excavations on the island of Umm al Nār near the bridge to Abu Dhabi Island and at several sites in or around the mountains have revealed remains of settlements from the third millennium BC.¹ Before the arrival of the Portuguese, the Arab tribes actively traded in the Gulf ports and, with the development of European trade to the Far East in the sixteenth century, the Gulf became increasingly more important. In the eighteenth century Dubai was a small fishing village and the first references to it in British India Office records of 1799 and 1820 note the fortifications there.²

However, it was in 1833 that the foundations of modern Dubai were laid when the Āl Bū Fālah section of the Banī Yās tribe from Abu Dhabi territory, numbering around 800 people, migrated to Dubai, which was then a small fishing village, and built settlements along the creek. Dubai had the advantage that its creek extended further inland than others in the area. At that time the creek was the dividing line between the Āl Bū Fālah and Qāsimī tribes. Although the latter half of the nineteenth century was a period of political and economic uncertainty for Dubai, trade grew steadily, if fitfully, in pearls, fish and firearms.

At the beginning of the last century, the population of Dubai was about 10,000 and consisted of three main areas: Shandaghah, an exclusively Arab area which comprised 250 houses; Dubai, populated by the Indian

community – Khojah and Hindu, which developed as the more important of the two western quarters probably as a result of its superior offloading facilities; and Dayrah, by far the largest settlement, with a mixed community of Arabs, Persians and Balūchis.

Dubai was one of many ports in the Gulf and Shaykh Maktūm bin Ḥashar (1894–1906) undertook a number of fiscal policies to encourage traders to take advantage of its commercial potential. In 1902 a law introducing very high taxes for imports and exports going through the Persian ports resulted in Sunni merchants migrating en masse to Dubai where they established a trading base. Goods from India were shipped direct to Dubai for re-export to the Arab shaykhdoms as well as to Persia and further afield. In 1900 the Shaykh signed a contract with the British India Steam Navigation Company for their steamers to call at Dubai and, by 1904/5, British ships were discharging over 70,000 tons of cargo a year in Dubai. This was also a boom period for the pearl-fishing industry.

By 1925 Persian taxes had become even more onerous and were seen to be permanent. Consequently the Sunni merchants who had initially taken up temporary residence in Dubai accepted Shaykh Sa'īd bin Maktūm's offer to settle permanently in Dubai and bring their families over.³ These merchants of mixed origins were given an area of land immediately to the east of al Fahīdī Fort⁴ on which to build themselves houses. 'It was an ideal site for a merchant community; close to the creek's edge where dhows unloaded, close to the market where business was conducted.'⁵ The district became known as al Bastakiyyah

as many of the merchants who settled there came from the port of Khamīr in the Bastak district in southern Persia. The influx of wealthy merchants led to the creation of an architecturally rich neighbourhood with a multiplicity of windtower houses, similar to existing buildings in the main city quarters of Dubai, Dayrah and Shandaghah.

The pearl-fishing trade went into decline in the 1930s due to expansion of the cultured-pearl industry, and World War II itself led to a downturn in the economy which did not improve again until the mid-1950s. In 1937 an agreement was signed with British Imperial Airways for their flying boats to land on the creek on their way to Australia, and this gave Dubai another fillip. Dubai had more 'stamina' than other ports in the region and managed to keep going, relying almost entirely on trade.

Until 1955 customs tax was collected by officials appointed by the Ruler, who used the first floor of the *Jumruk*, next to his summer palace in Dubai overlooking the creek, as an office. All trading goods were brought ashore nearby. In 1951, Gray Mackenzie and Co., the shipping agent, erected a crane by their office, and warehouses developed along the creek up to al Bastakiyyah. In order to make further improvements in port facilities, in 1954 the Ruler appointed Sir William Halcrow and

Partners, a British firm of consultants, to advise on dredging the creek. In 1958 Shaykh Rāshid bin Sa'īd succeeded as Ruler, and shortly afterwards appointed a British firm of architects and town planners, John R. Harris Architects, to prepare a town plan for Dubai.⁶ A new port office and warehouses were erected on the land reclaimed between al Bastakiyyah and the creek and al Bastakiyyah itself was zoned as a residential area.

Oil, first found in the Trucial States in 1958, was discovered offshore from Dubai in June 1966 and exports began in 1969. This rapidly accelerated the pace of change and growth in Dubai and its population increased from 59,000 in 1967 to 120,000 in 1973.⁷ In less than twenty years Dubai was transformed. The rise in imported goods reflected the dramatic rise in Dubai's size: imports in 1958 amounted to three million pounds but had risen to 42 million pounds just nine years later. Travel by donkey and camel quickly diminished when the first roads were built in the early 1960s and the first road crossing of the creek, the Āl Maktūm bridge, was completed in 1963. With the Emirate's economic diversification and industrial growth, the population of Dubai continued to increase rapidly: from 278,000 in 1980 to 640,000 according to the 1993 census.

The development of Al Bastakiyyah

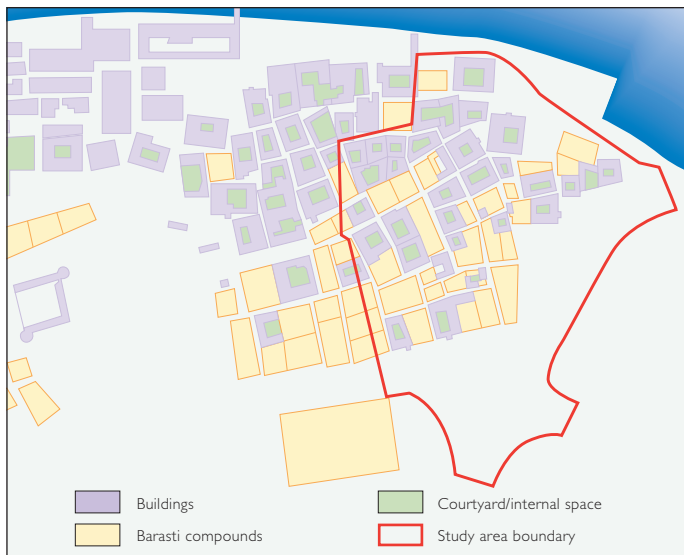
The first settlers in al Bastakiyyah appear to have arrived around the turn of the last century and probably lived in palm frond or barasti houses close to the present location of the Grand Mosque. No records are available on the early development of al Bastakiyyah, but it must be assumed that the area underwent rapid development from 1925 with the arrival of the Sunnite merchants up until the economic recession in the 1930s, and that many of the coral windtower houses were completed during this period. These were mainly built by merchants, whose businesses and stores were located in the *sūq* nearby. Some buildings had rooms specifically

reserved for visitors coming to conduct business and there were also a number of small shops catering for local residents.

The earliest aerial photographs available of al Bastakiyyah are oblique views dating from around 1950; unfortunately the more detailed aerial photographs from the same date do not show al Bastakiyyah and only the extent of the built-up area can be picked out from the overall broader scale views. Vertical and other aerial photographs exist for the later 1950s and 1960s, but are not precisely dated and suffer from a lack of clarity. However, from these it is possible to provide a fairly clear

picture of al Bastakiyyah in 1950 and of the changes it underwent between 1950 and 1970. There are few detailed records and photographs of the area earlier than 1950.

The first buildings of al Bastakiyyah developed, as might be expected, close to the end of the palace and along the creekside. The only exceptions appear to be three large houses with porches that were built on the south side of the area overlooking the desert. These plots still exist, whilst most of the earlier development in this area has been demolished. Substantially built properties are concentrated in the north-west of the area. The remainder were developed with compounds, mainly from barasti buildings, although often within block-built compound walls rather than a barasti enclosure. Some of these were individual houses, though some appear to have been 'attached' to larger houses as backyards or for



Above
Bastakiyyah in 1950

keeping animals in. In total there were over fifty substantial houses, nearly all with windtowers, and forty or more compound plots.

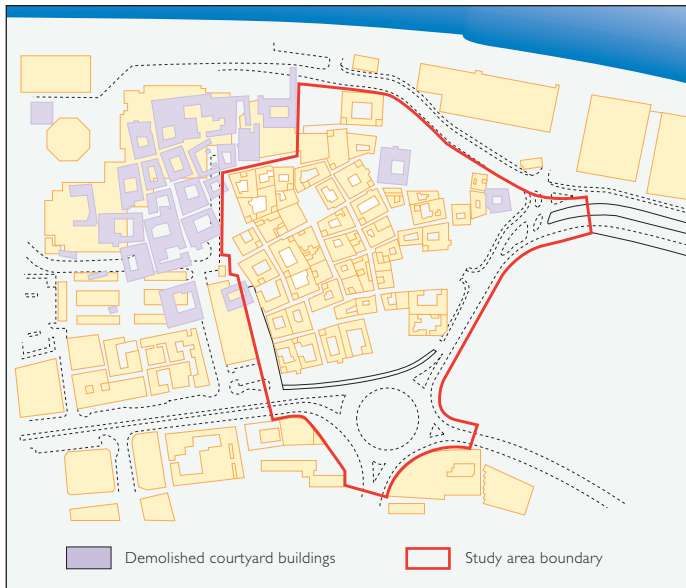
The illustration above shows al Bastakiyyah as it was in 1950. From this can be seen the extent of al Bastakiyyah in relation to the Dubai *sūq* area and the Ruler's palace/port office complex. Particularly noticeable is the large open area surrounding the al Fahīdī Fort, which extends up to the watchtower, controlling the approach



Above
Bastakiyyah changes, 1950 to 1970

to Dubai, and presumably dictated the western boundary of al Bastakiyyah. From this it can be appreciated that al Bastakiyyah developed as a separate and compact district only linked directly to the palace/port area along the creekside.

The main changes that occurred to the structure and fabric of al Bastakiyyah between 1950 and 1970 can be discerned in the illustration above. There were three principal changes. Firstly, the expansion of port facilities – initially in the palace area which later extended east along the creek – followed by land reclamation and construction of the port office and warehouses. Secondly, the development of roads, to the east but particularly to the north of al Bastakiyyah, which further separated the area from the creek. Thirdly, the increasing wealth of the inhabitants which saw the construction of substantial buildings on plots that had previously been barasti compounds. Some of these were built to traditional designs and included windtowers, but others were built in modern styles. Reinforced concrete structures were used for some buildings, including houses with windtowers (for example plot 15A). At the same time some of the barasti compounds were abandoned, leaving open spaces in the previously fully occupied area. Development in the previously open area between al Bastakiyyah and the Fort was underway and the watchtower was demolished.



Above
Bastakiyyah in 1994

Looking at al Bastakiyyah more recently there have been two further major changes in that time. Firstly, the gradual abandonment of the district over the past ten years by the original occupiers, as they moved to new homes outside al Bastakiyyah with modern facilities, such as air-conditioning and immediate car access – facilities that are difficult to provide within the existing infrastructure. Secondly there has been extensive demolition within the district of many of the oldest and largest houses, due to the Diwān development, and altogether some twenty houses have been lost. Two of the oldest in the eastern sector were demolished, one because the structure had become dangerous and the other to make way for a road scheme.

The courtyard house

Many of the houses in al Bastakiyyah were originally barasti or palm frond structures within a barasti enclosure or compound wall. With increasing affluence, coral or later *tābūq* (sea-sand lime blocks) replaced these flimsy structures. The houses are typically single storey, with a courtyard and a windtower cooling a ground-floor room and a screened roof terrace for sleeping in summer. The height of the roof-terrace screen wall tends to give the impression of a two-storey building. In the larger houses, a summer roof room and loggia would be added to the first floor, and in a few cases (for example plots 87 and 122) there was also a first-floor windtower connected to a loggia as well as a ground-floor windtower room. On the whole though, the houses are not as large as they appear and are distinctive in that they look outwards as well as to the courtyard, with window screens or the loggia arches and sometimes a balcony overlooking the *sikkah* or street. However, the defining architectural concept behind all these houses is one of providing maximum privacy for the family from the outside world. The only external openings are the separate family

entrance (in larger houses) and small ventilation openings. In contrast, the public areas for visitors, the *majlis* and sometimes the guest room have windows opening onto the *sikkah* with, in larger houses, a main entrance.

The houses of al Bastakiyyah vary in layout and detail, but most follow the basic principle of an enclosed private family area centred around a courtyard, with a separate area including a *majlis* for visitors. In detail, the houses would vary with individual needs, the wealth of the family, the particular shape, size and location of the plot, and they would invariably be adapted to meet changing family needs from time to time. Suites for all generations, grandparents, married sons and children were provided and new houses would be built alongside on the family plot, if space allowed, or, if not, on nearby sites. Consequently, the original layout and uses of rooms may have changed and what exists today is a particular stage in the ongoing evolution of a house, the older ones perhaps much changed, some of the newer ones never fully completed and decorated.

The Islamic tradition is for residential quarters to be formed of relatively small homogeneous communities with common religious, ethnic or occupational ties. Distinct quarters were often built by migrants sharing common origins, and were not divided by status, so that the rich and poor lived alongside each other in a social microcosm. The distinct demarcation between public and private life is an essential element of all Islamic communities: within the home there are degrees of privacy,

with reception areas for visitors and family guests and the family sanctum. These divisions are expressed architecturally in the traditional courtyard house, and constitute the most important social aspect of domestic Islamic culture. The house is conceived from the inside outwards, with the main decorative emphasis on interior elements such as the courtyard façade, whilst the street façade is usually relatively plain. The courtyard is the focus of every day life in the house as well as for social events.

Climatic design

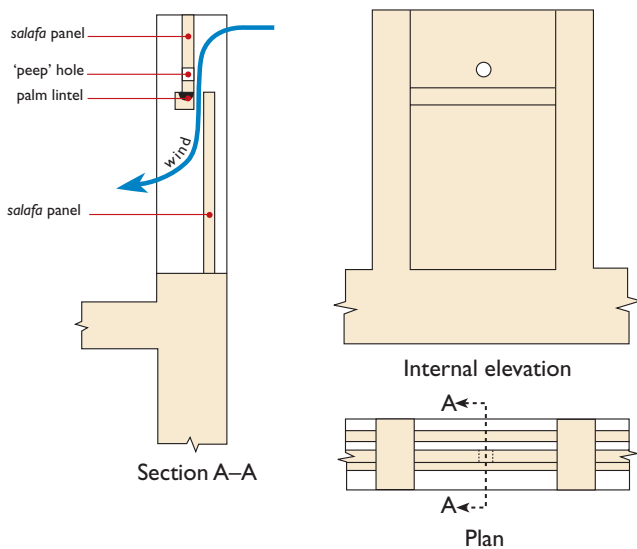
The hot climate of the Gulf was a major factor in the design of the al Bastakiyyah houses, and measures to overcome the dust, wind, sun and rain had to be incorporated into buildings. During the summer the climate is disagreeably hot, often between 38°C and 49°C and with high humidity. In winter the climate is much more pleasant with temperatures between 13°C and 16°C with lower humidity. Rainfall in Dubai is no more than 50 millimetres per year.

In hot and humid climates cooling, which is best achieved by ventilation, is of primary importance and a variety of screens were used to achieve this in the form of diagonal or louvreed timber strips, wrought iron and cast plaster or claustra. Screens provide the dominant decorative feature within the buildings, in particular the geometric and botanical designs of the carved wood and claustra and are themselves functional ventilators. In addition their effect is to 'create a degree of privacy across the house between different family zones, breaking up shapes and movement into a network of light and shade. The plaster and metal screens above the doors and windows of the ground floor ventilate the stores and winter rooms, allowing smoke and hot or stale air to escape from the latter.'⁸ Openings were unglazed and wooden shutters were used when necessary to shut out strong dust-laden winds.

The windscoop or ventilating screen is the simplest form of ventilator used in hot regions. These are flat

façade screens placed as high up as possible on the outside walls, slightly offset to create an interior cavity to 'catch' the wind and direct it down into the room or space inside, at the level of people sitting on the floor. According to Alison Coles and Peter Jackson, 'There is a timber close that can be slid across the gap to eliminate the draught if necessary. A spyhole often appears as a feature at head height. Like the windtowers, these modesty screens are sometimes known as "bād gīr" or "windcatchers", although they are more properly called *bād kash*.'

The windtower is a more sophisticated device, designed to cope with seasonal or diurnal changes in the direction of the prevailing wind. 'The land breeze is from the desert; its air is light, dry and often hot. In contrast, the sea breeze which blows in the afternoon is both cool and strong, although it is humid and tangy with the smells of the seashore. These windtowers only work if a wind is blowing; there is quite often a period of calm from about 7 p.m. to about 2 a.m. ... Windtowers on two-storey buildings often rise about 15 metres above the ground. At this height wind velocity is about one-and-a-half times greater than at 1 metre above ground level. At least half the length of the windtower.'¹⁰ Multi-directional coolers were described by Marco Polo when he passed through Hormuz in the late thirteenth century: 'The ventilators are set to face the quarter from which the wind blows and let it blow into the house.'¹¹



The square external face of the windtower is of loadbearing construction, usually using lightweight coral lumps for the columns (although at least one example is of reinforced concrete). The towers are reinforced and strengthened by a series of horizontal *shandal* poles, whose projecting ends served as scaffolding. There is no vertical timber framework. It has a vertically aligned x-configuration of internal planes using a panel system of *salafa* slabs supported on *shandal* wood which catch the breeze and act as a funnel, accelerating the descending air into the room below. The downward flow is balanced by an up-draught of stale hot air on the leeward shaft. The bottom of the tower would stop about 2 metres above floor level allowing people to sit on cushions or sleep in the moving air under the tower. In winter the windtowers would be closed off with wooden shutters. In some two-storey houses the windtower would ventilate a first-floor summer room, but in al Bastakiyyah nearly all ventilated a ground-floor room.

Insulation also helps to ease the excessive temperatures and coral was one of the main materials used in al Bastakiyyah. Not only is it one of the few building materials available in Dubai, but it also possesses good insulation properties (having many cavities), and this, combined with the thickness of the walls, assists in temperature control – cooling in summer and retaining heat in the winter.

The traditional use of rooms in the al Bastakiyyah houses is flexible, characterized by changing diurnal and



Far left
Typical windscoop detail

Left and below
Illustration shows windtowers

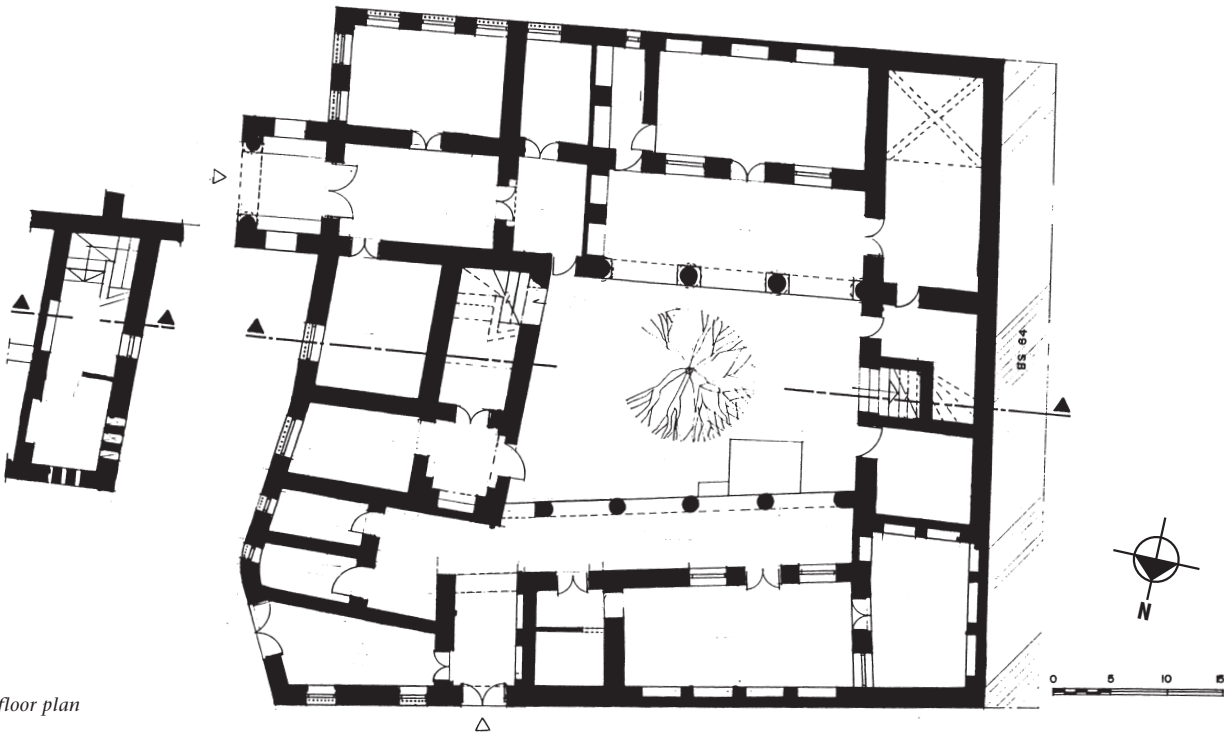


seasonal patterns of use. A colonnade or arcade situated on one or more sides of the courtyard provides an outdoor living area shaded from the hot sun in summer and maintains warmth in winter. The low rainfall permits the use of flat roofs, which double as summer living space.

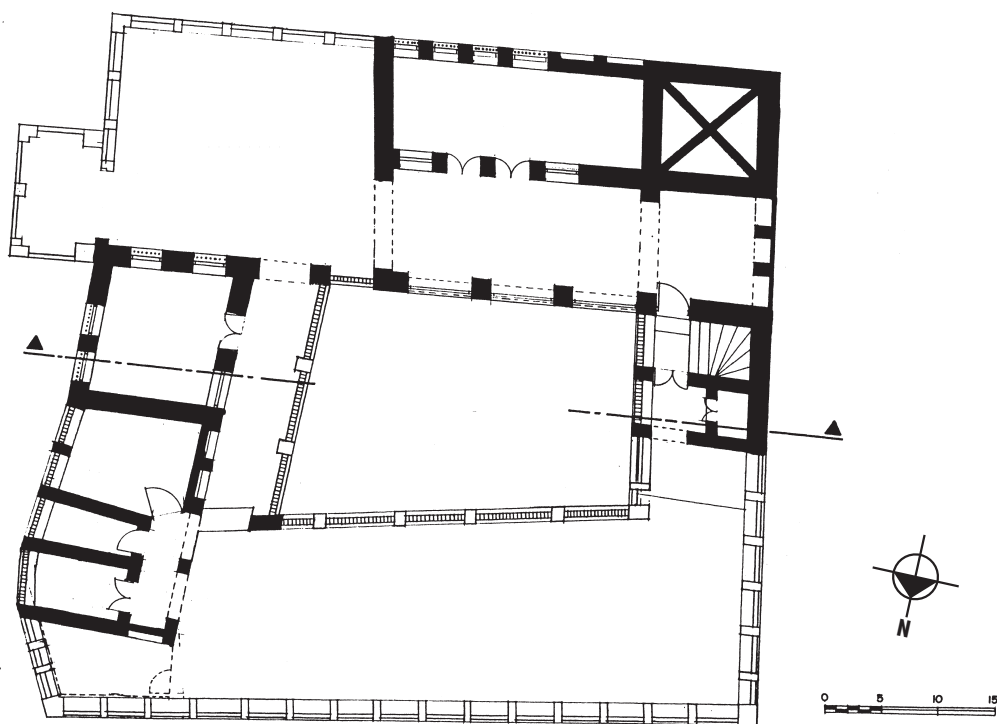
There is little through draught in ground floor living rooms; because of the need for privacy and security only a few small high level ventilation holes pierce the external walls. At first floor level the outside walls often have modesty panels, and the arches above the display shelves may be of perforated plaster work. The air is cooler and less dusty than at street level, and there is less radiation and glare from the courtyard. In many of the Bastakiyyah houses the windtowers terminate in first floor rooms, but where they are used to cool a ground floor room there is obviously less need for migration.¹²

Plot 43

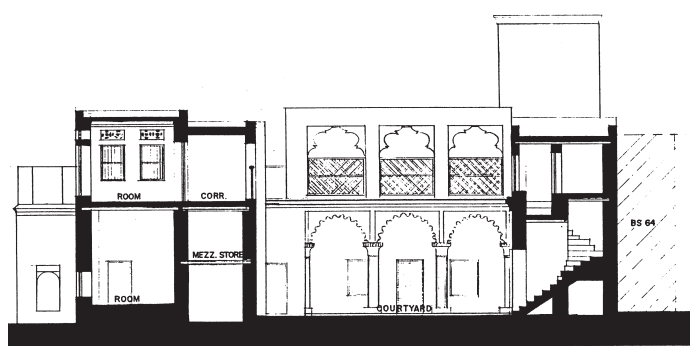
An existing medium-sized house on plot 43 is described below in detail and illustrated below as it contains most of the important elements found in both large and small al Bastakiyyah houses.



Right
Ground-floor plan



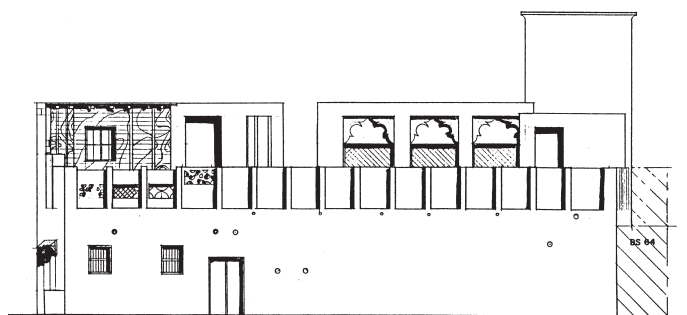
Right
First-floor plan



Section looking south



South elevation



North elevation



East elevation

The public (or visitor) area

The layout of the house on plot 43 shows exceptionally clearly defined public and family areas. The public suite comprises the entrance hall, the *majlis*, the guest room and bathroom. The exterior *majlis* consists of a small terrace outside the porch and is used as an informal meeting place for neighbours. It is not a common feature, but was provided in some of the larger houses; only this one has been identified in what remains of al Bastakiyyah. The porch with seats each side is the main entrance for non-family and business visitors. Only the larger houses had porches and there are five remaining examples in al Bastakiyyah. There is a masonry wall across this example, which may have been incorporated to keep out high tides or blown sand. In houses closer to the creek, which are more vulnerable to exceptionally high tides, the ground floors are blank.

The main door is a typical studded double door. The entrance hall has an entrance to the *majlis* and the guest room. The principal room for entertaining guests is the *majlis* which has externally facing windows on two sides. 'Prominent families in Dubai traditionally "sit" or hold open house in their *majlis* in the evening ... The floor of the *majlis* is often a few feet above ground level at the same height as the bottom of the large windows so that guests seated on the carpets are assured of maximum breeze.'¹³ The guest room, which has an externally facing window, is used for overnight guests and for dining. Virtually all the houses in al Bastakiyyah have a formal *majlis* but only the larger houses have guest rooms or a separate bathroom for visitors. A lobby from the hall gives access to the bathroom, and through a normally closed door to the family quarters.

Some of the houses of al Bastakiyyah included merchants' stores and offices, although general business would be conducted in the *majlis*. In this particular house, a shop was incorporated in the north-east corner, with direct access to the family entrance. Outside is a stone seat for the shopkeeper. There are simple double doors, rather than the more common four-leaf doors of *sūq* shops. Shuttered windows face the *sikkah*.

The family area

The family entrance to the house is a more modest door leading via a lobby to the courtyard. This example is a fairly direct route; in other houses the entrance door was designed to avoid direct views of the courtyard. According to Alison Coles and Peter Jackson's study 'the back door opens on to the shaded narrow alleys of the al Bastakiyyah quarter. This door is used by the women when they are on their own. They move comparatively freely within the secluded streets of the neighbourhood and evening visiting is an established social custom.'¹⁴ Above the entrance is a mezzanine store, accessible by ladder. The courtyard itself is medium-sized and originally had a tree in the centre. The main veranda, where the women of the family gathered in the morning and evening, is wide and gives access to the windtower room and a family room. On the opposite side of the courtyard is a narrower veranda which gives access to the main family suite and provides shade for the rooms from direct sunlight. The windtower room is typical of an al Bastakiyyah ground-floor windtower; it was used in hot weather and was where the family sat on cushions or slept and was closed off during the winter.

The family rooms, arranged around the courtyard, were used both day and night, unless the weather was

very hot in which case the roof was used for sleeping. The more important family members would have had a suite of rooms. Each member of the family or married couple had a room with a connecting bathroom. On the first floor is a family summer room with windows facing outside fronted by a loggia. Additional rooms for the expanding family were built when necessary and a good example is the roof extension on this building which was built perhaps 15 years ago.

The main bathroom adjoining the family entrance and serving the main family suite still retains a fine example of the traditional screen wall which stops just below the ceiling. All the rooms have niches at different levels for everyday objects. The kitchen and service area is situated on one side of the courtyard, conveniently close to the entrance and door into the *majlis* wing. The kitchen faces the courtyard, with a dishwashing room at the rear and a back kitchen area which may have contained a well. In al Bastakiyyah

the wells (*chaab*) are only a few metres deep and because of the proximity of the creek the water is brackish. In the past householders arranged for sweet water for drinking to be delivered by donkey ... Well water can be raised to the first floor overhead by pulley ... Traditionally, cooking was done at ground floor level using wood or charcoal as fuel. The roofs of the older kitchens (*matbakh*) are still blackened with smoke ... Normally, the men shopped for fresh food in the early morning. The women often prepared the food for cooking on the verandah or while sitting together in the courtyard, rather than in the less pleasant conditions of the kitchens.¹⁵

The mezzanine floor over the service area is approached by stairs and would have contained stores for dates and onions.

In the past the middle class families of the Bastakiyyah required considerable storage space for household necessities. Most of their supplies came from afar and were only seasonably available. Many



Above
Typical courtyard detail

foods could only be bought cheaply immediately after harvest, and vagaries in the weather could affect the arrival of imports by sailing dhow. Moreover, although the merchants had business premises in the market, rooms in their house have often been used as extra warehouses for storing goods.¹⁶

The main stairs to the first floor are a typical U shape, with two spyholes or vents looking out over the

courtyard. The columned roof loggia, at the head of the stairs, was used as a shaded sitting area in the hot summer months. This leads into a summer family room, with windows on both sides. The screened roof forms an open but private roof terrace screened by high parapet walls. Some houses have *bād gīr* at this level. Over the front is a newer family room and bathroom added to meet expanding family needs.

Construction methods

The merchant houses of al Bastakiyyah are heavy masonry structures built on the beam and column principle. They were individually designed around evolving family requirements on a plot allocated to the family by the ruling shaykh. The building would be planned and built by about three masons, with nine or ten labourers, and two carpenters as and when they were required.¹⁷

Foundations were usually between 1–1.5 metres wide and 1–1.5 metres deep. They were built of sea-stone or, occasionally, imported stone. Walls and piers were constructed of coral, shell-stone and blocks. Coral walls were usually three blocks wide to give a wall thickness of approximately 600 millimetres. According to Alison Coles and Peter Jackson's study: 'The finer masonry is built of slabs of limestone 2–3 centimetres thick and about 20–30 centimetres across, which are laid on edge in a diagonal pattern. The slabs are used to form partitions, the modesty screens along the first floor perimeter and the high diagonal cross-walls of the windtowers.'¹⁸ Decorative columns were sometimes made by binding three or four *shandal* poles together after which they were plastered.

The first floor and roof structure was supported on either round *shandal* poles or rectangular timber joists. *Shandal* poles were used for ceiling joists and lintels in the earlier buildings and were often left projecting to provide maintenance scaffolding, or the full length could

be reused if the timber outlived the remainder of the building. For lintels, the poles were bound with coir string (hemp chords) to give a key for plastering. The average length of the poles of 10–12 feet restricted the width of rooms; occasionally hardwood beams were used to achieve greater spans – when they could be afforded, or more recently as they have become more widely available.¹⁹ Palm ribs and sometimes split bamboo were laid diagonally over joists to support palm matting. Palm frond matting was used as the ceiling finish and support for the gypsum/lime/mud/clay floor or ceiling above. This was the cheapest and original method but wooden planks were used in preference to palm ribs/frond matting for ceilings and floors when it could be afforded, and this method became more commonly used later. According to Alison Coles and Peter Jackson, 'Where ceilings are required in living or reception rooms, timber boarding is pinned to the underside of the [poles or beams], often with decorative plaster cornices or scalloped, painted timber edging.'²⁰

White gypsum was used for high-quality finishes on internal plasterwork and incised decorative panels or screens: 'the intricate screens and the elaborate arch facings ... are cast on the ground in wooden moulds and dry quickly in the sun before being lifted into place. The arch facings are in two pairs, left and right, which are spaced about 25 centimetres apart, the gap being filled

with coral and plaster. No further framework is required as the paste dries so quickly.²¹

The roofs were laid to a slight slope to aid drainage and then finished with lime mortar. Lime mortar was also used for waterproofing drainage channels. Simple water chutes or gargoyles conduct the water away from the walls onto the sand. Where the space between buildings is restricted, water channels were cut into the external wall allowing the rain water to run directly to ground.

Materials

Three main building materials are used throughout al Bastakiyyah: coral and shell-stone, which generally appears in the oldest houses; sand and lime block or *ṭābūq*, which was used concurrently with coral for many years and then took over as the main material; and concrete blockwork and reinforced concrete which was adopted in the 1960s and 1970s.

Coral was taken from nearby reefs and left in the sun for a few weeks to reduce its salt content.²² It was considered to be the best building material but was expensive. It was nearly always used for windtowers because of its lightness (it floats when it is dry). Its cellular quality also gives it good thermal insulation value. The scarcity of coral means that in general the older the wall the larger the lumps. Shell-stone/sea-stone was collected from along the creek at low tide. Large lumps were broken up *in situ* into smaller lumps. It is denser than coral but is equally strong and was more commonly used than coral, particularly for foundations. Thin flat sea-stone slabs, *salafa*, were also taken from the edge of the creek at low tide where they occur naturally. The top surface of this stone is worn flat by the action of the sea and presents a ready-made finish. The underside of the slabs, which could be 15 centimetres or more thick, was then chiselled away to leave a slab about 5–7.5 centimetres thick. The slabs were used for facing, for in-fill panels and windscoops and in particular for the internal cross-vanes of windtowers.

Sea-sand lime blocks, *ṭābūq*, were the forerunner of modern concrete blocks and were made with unsieved sea-sand, including small pebbles and shells, mixed with lime and later cement. The salt content makes them friable, and they were often used higher up in buildings where they

would be less prone to rising damp. The blocks are approximately 30 x 20 x 20 centimetres. Much cheaper than coral, the blocks were used from the 1940s onwards until the advent of more modern techniques and materials. Originally they were individually handmade, being pressed in the morning, sprayed with water in the afternoon and then left to dry ready for use the next day; at a later date they were machine made. The colour varies from sand to a greyer colour, which may reflect the mix ratio of sand to lime or cement, the sandier-coloured ones appearing to be the earlier blocks. Some blocks can be seen to contain small lumps of coral (for example plot 121) and this may have been to provide extra strength and to use up surplus small fragments. Concrete blocks eventually replaced *ṭābūq* and are still used extensively for extensions and repairs.

A variety of mortars are used, subject to cost and availability, each mortar having its own slightly different properties and uses. The lower parts of the buildings were generally rendered with *ṣārūj* mortar in order to counteract rising damp and salt-water penetration as it has excellent waterproofing properties. Most *ṣārūj* was imported from Iran and was made by mixing red clay and manure which was then dried and baked in a kiln. Gypsum was used both as mortar and render. It was dug from the salt marshes at the end of the creek and fired or baked as required. Cement was introduced in the 1950s and was used extensively for rendering and mortar. It was easier to use than gypsum but sometimes fails to bond well with older materials and, according to Alison Coles and Peter Jackson, '*Ṣārūj* is stronger than gypsum and better than cement ... as it does not increase the thermal conductivity of the masonry. Consequently the internal wall surfaces remain cool.'²³

Structural timber of various kinds was used in different parts of the building. *Shandal*, or mangrove, are round hardwood poles imported from East Africa or the Malibar coast of India. Tamarisk was sometimes substituted and rectangular timber was introduced at a later date for joists and other uses, replacing the *shandal*. Occasionally hardwood beams were used to achieve greater spans and thus bigger rooms than was possible with *shandal*. Imported hardwood, mainly from India, was used for doors, window frames and shutters.

Occasionally it was used for decorative pierced screens. Locally available palm trunks were sometimes used as an alternative to *shandal* poles for lintels. They were a cheaper alternative, being freely available locally, but palm being a softwood was not as strong as *shandal*. Palm fronds were

also used in the simplest and cheapest traditional method of construction known as *barasti* which was used for poorer houses, outbuildings and enclosures – none now remains in al Bastakiyyah. *Barasti* was made from *shandal* poles and palm fronds bound together with string.

Architectural interest

The main interest in al Bastakiyyah lies in the architecture of the buildings, particularly the windtowers and a number of other elements such as balconies, windcatchers and *majlis* windows which make up the visual character of the area. Because of the courtyard layout, much of the decorative visual interest and architectural merit of the buildings is only visible from within, and visitors have to enter the private courtyard spaces in order to fully appreciate the quality of each building. For this reason, the architectural features of the buildings have been analysed in three categories: those visible from outside the building; features visible from the courtyard; and interior features.

External features

The illustration to the right shows the main external features of interest; the older coral buildings generally have more of these than the newer buildings. The main external architectural features are: the remaining 25 windtowers which dominate the skyline; porches on plots 19, 43, 63 and 122; balconies on 13 plots; *majlis* windows (though many of these are blocked up or in poor condition); main doors; windscoops; and external panelled walls. In addition there are occasional smaller features such as doors, foul drainage outlets, water chutes, and ventilation openings.

Windtowers are most commonly situated on the corner of a house and form an important element of the street scene, rising up to 15 metres on two-storey houses. They are characterized by their great variety of architectural detail and vary from two to three tiers high and between two and six or more bays across. The only



Above
External architectural features

remaining three-tier windtower is on plot 69, though this is now in very poor condition, having once been one of the finest in al Bastakiyyah. Nearly all of the windtowers have decorative plaster arches between the piers and two (plots 69 and 121) have plaster finials on top. Research from aerial photographs taken in 1978 shows that plot 87 had two windtowers which have since been demolished. It may be desirable to rebuild these when restoration of the area takes place.

Only a few important houses have porches – remaining ones are on plots 19, 43, 63, 69 and 122. Where space was available porches are square in plan



Above
Main door, plot 69

with side openings and seats, as for example on plot 43. The porch on plot 69 is restricted in depth by the width of the *sikkah*. Porches usually had a decorative screen above, for example plot 69. On a number of houses cantilevered wooden balconies project over the *sikkah*. These are constructed of square timber, with latticed or decorative balustrades and fretwork fascias to the floor and roof.

The main door is usually a double door, sometimes with a small door within one of the leaves for everyday use. Three examples remain on plots 69, 107 and 113A, though the original front door on plot 121, which has been removed, is still stored in the courtyard. These large double doors were opened for celebrations and expected guests. Shops and stores usually have folding doors with two or four leaves. Other front doors are simple two-leaf doors which may also be carved and studded. The design of the door to the family entrance is generally less elaborate although vertical studded boards, decorative carved panels and plain square panels are sometimes incorporated in the design, as illustrated above. More recently, decorative metal doors have been used. On the exterior of these doors there is a variety of metalwork, bolts, studs, door knockers (for example plot 69) and chains (for example plot 43); internal door hinges and bolts are by contrast often wood.

On the ground floor, windows were only provided to the *majlis* or guest room. These are two-panel vertical

windows, with metal bars and internal wooden shutters. Smaller versions of this design were used for windows to shops and other miscellaneous external windows. Windows also appear at first-floor level on two-storey houses (for example plot 43). Glass was not used, though the internal fanlights on plots 84 and 111 are glazed. Ventilation openings were used instead to give occupants the benefit of cross-ventilation whilst maintaining privacy. They consist of small openings, high up in the walls and are of two types: circular, and square or rectangular, with metal bars in larger houses.

Windscoops are incorporated into the panel structure, at either ground- or first-floor parapet level. The wall windscoops comprise thin screens, usually of *salafa* sea-stone slabs, which create an interior cavity in the exterior walls. The inner screen is supported on *shandal* or palm lintels. The column and slightly recessed panel structure of the walls provide a decorative feature on parapets in particular. Decorative plaster screens and panels occur at first-floor level, and occasionally in relief. The corners of buildings on *sikkah* corners are sometimes chamfered (plots 19, 71, 100, 121) with a semi-circular or diagonal recess to prevent damage from traffic. Further ornamental features may consist of two-colour plasterwork such as that on the door surround of plot 84, and coloured paint as on the windtower cornice of plot 69.

Drainage features include water chutes which are used to drain the gently sloping roofs. Traditionally made of wood, they form a major feature of visual interest along the street façades. Foul drainage consists of two types: vertical coral ducts from first-floor facilities; and plaster domes covering ground-floor outlets.

Courtyard architectural features

The architectural features visible from within the courtyard are shown opposite. The main feature of the courtyard, which is usually paved, is the central tree, often Indian almond, occasionally a date palm. Plants in pots were also used to add greenery. Other visible features are: the surrounding verandas with their decorative columns and arches; wooden balconies; and detailing such as claustra, doors and windows.



Above
Architectural features in the courtyard

The veranda is the most important feature of the ‘traditional’ courtyard house, providing shade and an exterior sitting area, usually at the front of the main family room. It consists of a roofed area supported by columns, at least two bays wide, and sometimes as many as six bays wide. The columns sometimes have capitals from which false arches spring, or else they form a rectangular frame with decorative in-fill panelling in the corners to create an arched effect. Arches are always false, since they are decorative in-filling under lintelled openings rather than structural fabric. Plain semi-circular arches are not used between columns, but appear frequently in claustra on verandas and loggias (for example plots 69 and 87). False arches used on verandas can be divided into four main types: the multifoil semi-circular arch which was mainly used on the older verandas (for example plots 43 and 87); the trefoil arch (for example plot 69); brackets, the most commonly used form of veranda arch which fills the corners but leaves a length of horizontal lintel between (these were still being built in the 1950s, for example plots 18 and 121); and complete brackets, where the two brackets join in the centre, which were used only occasionally (for example the loggia on plot 43).



Top and above
Courtyard feature

The doors to family rooms opening off the courtyard and interconnecting rooms are made to a variety of designs including decorative carved panels and plain square panels. Windows to the courtyard are two-panel vertical windows, with metal bars similar to the external *majlis* windows. Decorative plaster screens and panels are a major feature of the courtyards and frequently occur above all the door and window openings, allowing cross-ventilation between rooms. Balustrades around the first floor of the courtyard are frequently very elaborate, consisting of pierced plaster screens (mostly in poor repair), for example plots 43 and 69. A variety of motifs are used: 'birds are a common feature, but the most dominant design is the geometric representation of flowers and foliage arranged in a vase. The moulded side of the screen has the most elaborate detail, and the plainer side always faces into the house-space.'²⁴

Horizontal *shandal* rails around the first floor of the courtyard seem to have been the norm in earlier buildings. Internal balconies are unusual; however, cantilevered *shandal* balconies exist in plots 71, 84 and 107. The arched fronts of the first-floor loggias are an important courtyard feature of larger houses (plots 43 and 121). Stairs are fairly functional, usually in a U shape, with relatively little decoration. Other areas of architectural decoration are: two-colour plasterwork on the 'lotus' capitals of columns in a number of houses, including plots 25 and 121; painted columns; veranda cornicing at plot 69; and decorative red paint on *shandal* ceiling joists.

Interior architectural features

The main internal features naturally repeat the openings from the outside – doors, windows and claustra. Ornament is mainly reserved for the *majlis* and main family rooms. The base of the windtower, which is approximately 2 metres above the floor, is sometimes decorated. Bathrooms are sited at the end of a larger room and are usually screened by a wall finishing just below the ceiling, with a pierced screen on the top of the wall which aids ventilation whilst maintaining privacy. There is a good example of such a screen in plot 19, the house that is now the Majlis Gallery.

Niches provide the main additional feature of architectural interest. These are formed within the wall thickness and are both decorative and functional. They provide storage space and decorate otherwise blank walls as well as economizing on building materials. The niches usually contain three levels divided by bands forming the shelves, the bottom two levels being used for objects which are used daily and the uppermost niche for storing objects used less frequently. Clothes pegs made of carved wood project from the wall and are often located between the *iwān* doors.

The ceiling joists are exposed, with round *shandal* poles supporting a layer of palm or mangrove matting upon which mortar is laid for the floor above. Square timber supporting boards are sometimes used instead and in the better-quality older buildings *shandal* poles are used to directly support the boards. In more important rooms there are cornices at the top of walls, often of the 'gorge' type.

Overview of buildings in Al Bastakiyyah

The top illustration on the next page shows the three distinct categories of building in al Bastakiyyah. The constant alteration and extension of houses means each building has its own distinctive layout and form and no two buildings are the same. The majority of buildings are houses with courtyards (39 in total, 69 per cent of the

site), though these vary greatly in size and layout from large symmetrical houses such as plots 69, 121 and 122 to small odd-shaped houses such as plots 74 and 87. There are six modern two-storey buildings (11 per cent of the site) with externally facing windows, mostly with no courtyard. Some plots (11 in total, 20 per cent of the

site) have never been fully developed and remain as compounds surrounded mostly by walls in sand and lime block. However, most of these compounds are now occupied by single-storey temporary buildings of plywood and metal sheeting and house many people.

The bottom illustration shows building heights in the area. The majority of buildings are only single-storey, though older traditional courtyard houses generally have more first-floor rooms as they developed before further building work was stopped. Modern houses on plots 15B, 15C, 32 and 86 are all two-storey. Plot 14 has a modern two-storey extension to an older courtyard house with the remains of a windtower.

The illustration at the top of the next page shows a summary of the existing plot ratio for each plot.²⁵ The average plot ratio for 'traditional' houses with courtyards is 1:0.86. Larger courtyard houses have an average plot ratio of 1:1 reflecting the greater opportunities for first-floor extensions. Average plot coverage for the larger courtyard houses at ground and first floor is 79 per cent and 21 per cent respectively. The 'modern' houses, mostly without courtyards, have an average plot ratio of 1:1.6, nearly twice that of courtyard houses. The use of external windows and air-conditioning has replaced the use of the courtyard house plan.

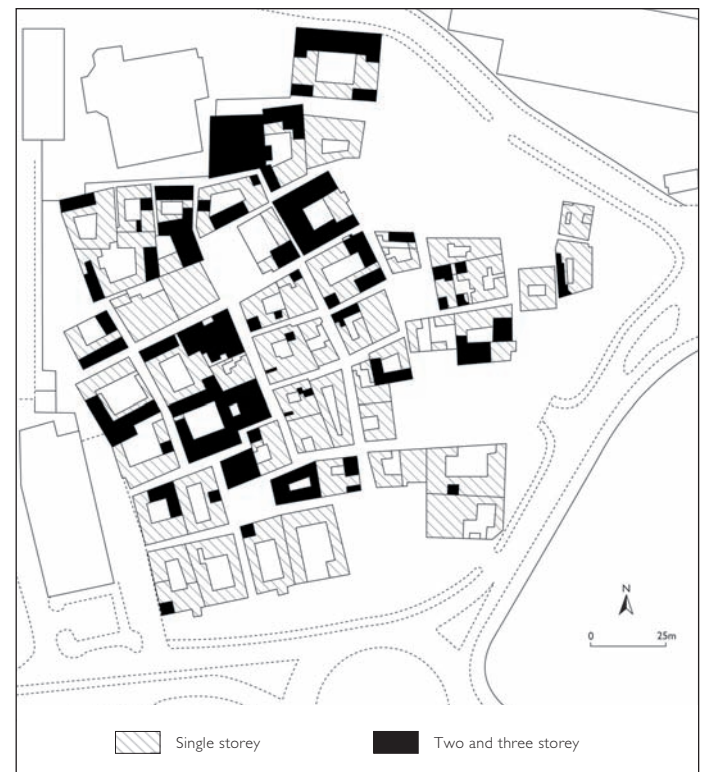
Development in al Bastakiyyah is broadly consigned to a forty-year period between 1920 and the 1960s. The general form of the buildings remained constant throughout this period, though new building materials were adopted when they became available and affordable. It was not until the widespread use of domestic air-conditioning that the traditional courtyard form was abandoned and modern-style houses were built without courtyards and with externally facing windows. It is therefore possible to determine the likely approximate age of each building from the building form.

The age of buildings, though important in piecing together the history of the area, is not as important a factor as the architectural merit of individual buildings, because some of the relatively new buildings have great architectural merit. It would be wrong to simply use age as a major determinant in assessing the value of individual buildings. Building age has therefore been divided into

pre-1950 buildings (mostly built from coral and sand lime blocks) and post-1950 buildings. Compounds with



Types of existing buildings



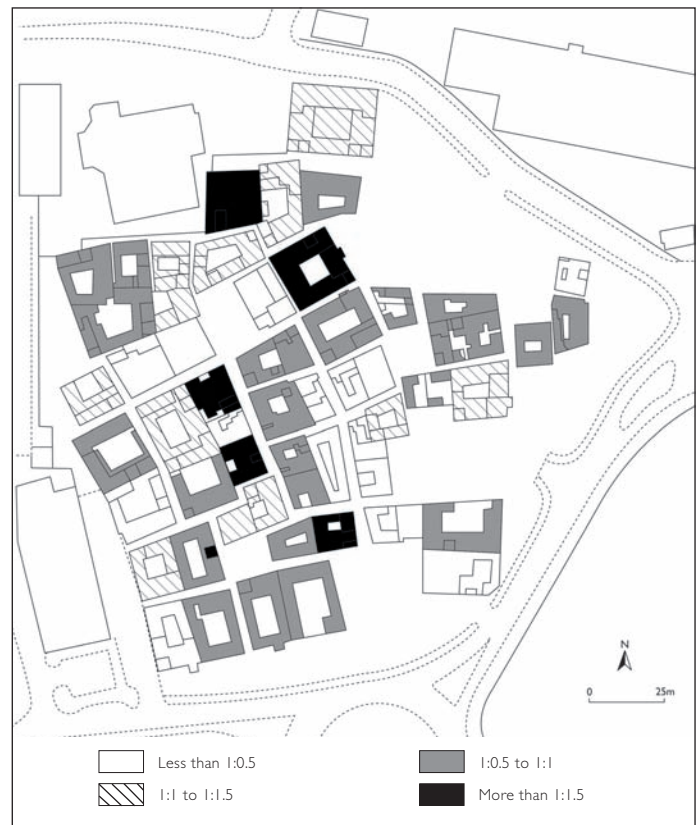
Heights of existing buildings

temporary structures are identified separately. The illustration below shows the age of the original building on each plot but many buildings have been added to and altered almost continually over the years. There are thirty buildings (53 per cent of the site) built before 1950 and 15 later buildings (27 per cent). Compounds with temporary structures occupy 11 plots.

The use of traditional materials such as coral or shell-stone does not necessarily imply greater architectural value. Some of the more modern buildings built of reinforced concrete have greater architectural merit than some of the older coral buildings, for example plot 15A which is a fine building with two windtowers. The illustration below right shows the predominant original building material for each plot. Out of the 56 plots and subdivisions only 13 buildings (23 per cent of the total number of buildings in al Bastakiyyah) are constructed entirely or mostly out of coral or shell-stone, whilst twice as many houses, 26 (46 per cent), are constructed out of sand-lime block. The sand-lime block houses usually have shell-stone foundations. Compound walls are mainly built of sand-lime blocks and surround 11 plots (20 per cent), and there are six modern buildings (11 per cent) which are made of concrete and reinforced concrete.



Ages of buildings



Existing plot ratios

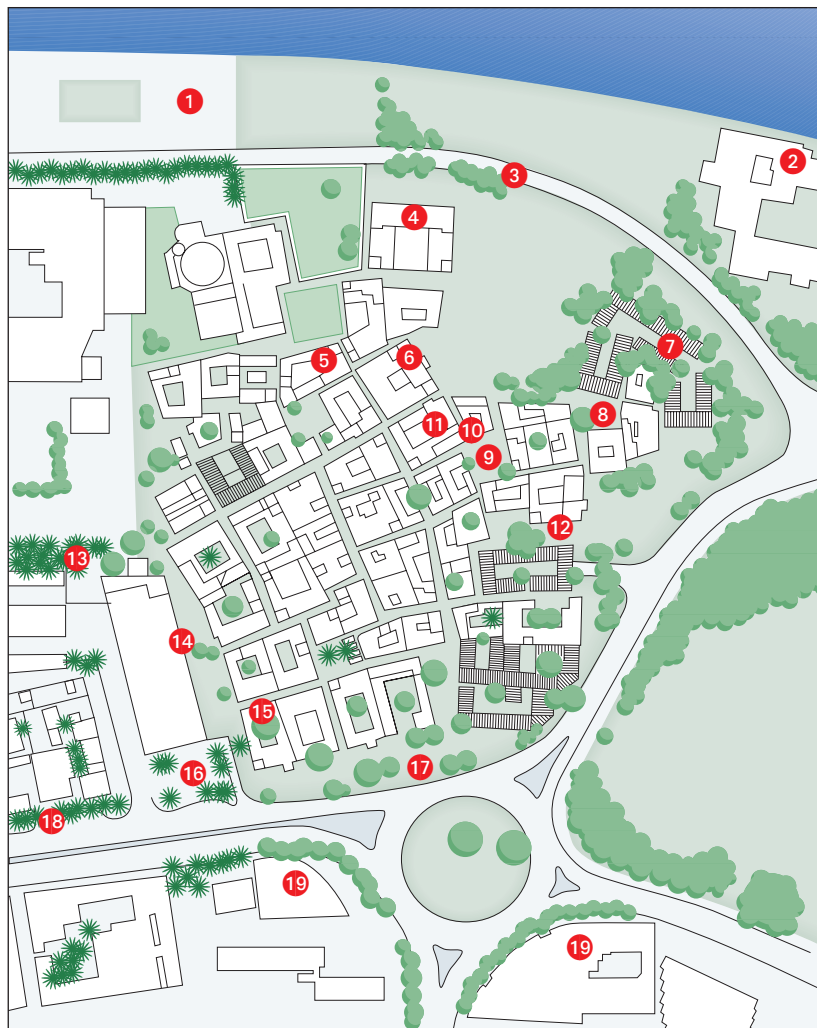


Building materials used in existing buildings

The conservation of Al Bastakiyyah

Although other windtower houses remain in Dubai, numbers are small, with only a few in Bur Dubai and Deira in scattered locations. The old *sūq* area in Sharjah also has a few examples and there are small groups such as those at Jazīrt al Ḥamrā in Ra's al Khaymah. Al Bastakiyyah, with its 25 windtowers, constitutes by far the largest concentration of this type of architecture anywhere on this side of the Gulf. As such it represents one of the most important architectural, historical and cultural assets not only for Dubai but also for the rest of the United Arab Emirates and the other Gulf states.

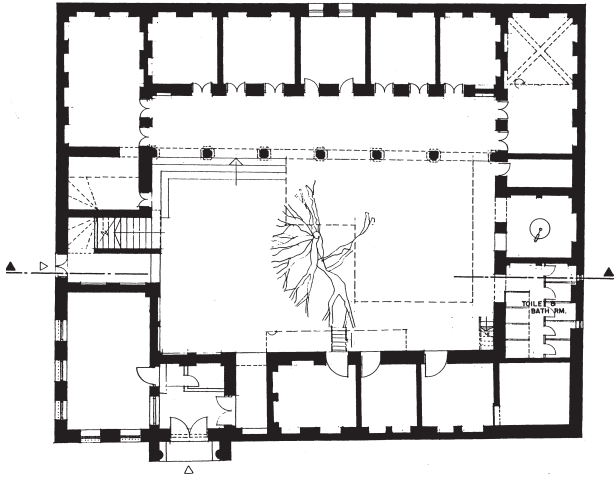
The buildings themselves, however, are not the only vital feature of al Bastakiyyah – indeed many of them are simple domestic structures of only moderate intrinsic interest. It is the fact that no other comparable grouping survives, and the townscape of narrow lanes between the severe coral and sand block walls, widening out occasionally to show impressive two-storey façades and windtowers and at times the modern city beyond, that make the area a vital link with Dubai's past. There is nowhere else that shows the city as it used to be; and it is a location full of historical significance, close to the Diwān, the creek and the *sūq*.



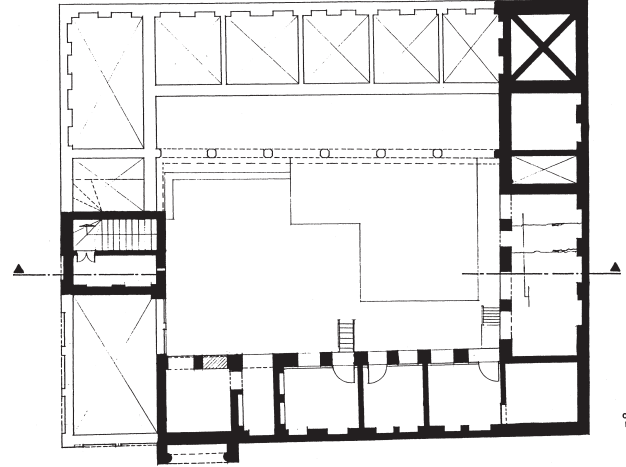
- 1 Permanent public access along Diwān waterfront promenade links al Bastakiyyah to the old *sūq*
- 2 Creekside development site
- 3 Re-aligned Diwān access road allows rebuilding of porch to plot 121
- 4 Arabic café/restaurant in plot 121
- 5 Restored house for rent in plot 71
- 6 The Windtower Museum in plot 122
- 7 Barasti screened and landscaped car parking
- 8 Small square outside the club
- 9 Windtower Square
- 10 New tourism office and toilets
- 11 Cultural Centre in plot 69
- 12 Plot 43 restored as 'Way of Life' Museum
- 13 New landscaped pedestrian link to Al Fahīdī Fort
- 14 Refaced Diwān wall
- 15 Restoration Unit Project Office in prominent windtower building on Al Fahīdī Fort
- 16 Improved car park next to sub-station
- 17 New soft landscaped edges to east and south
- 18 Tree planting to improve Al Fahīdī Fort
- 19 Advertisements removed from the rooftop of the Dana Hotel and other high buildings

Illustrated master plan

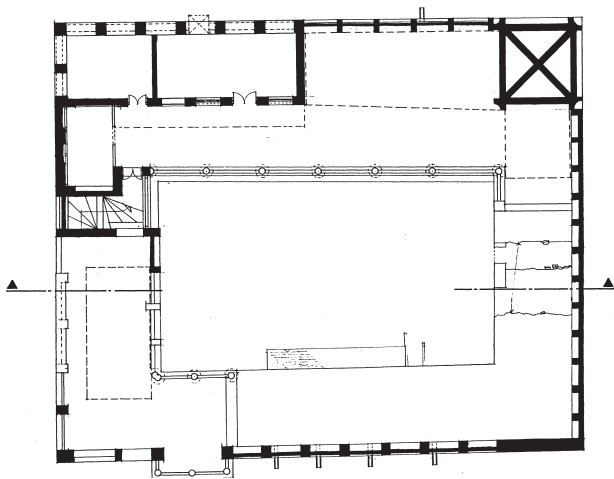
The Windtower Museum, plot 122



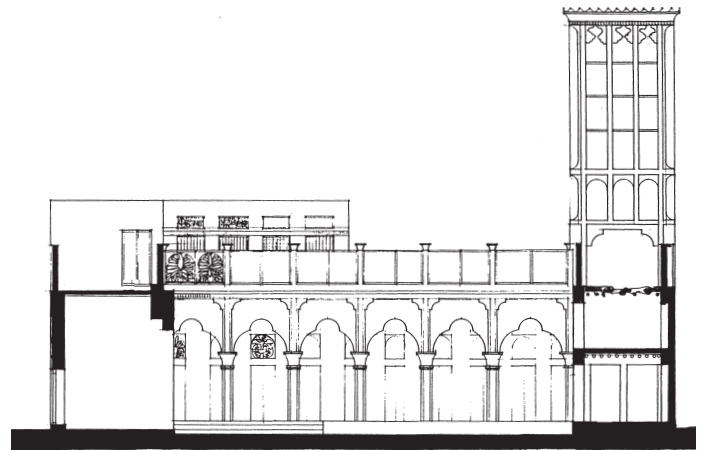
Ground-floor plan



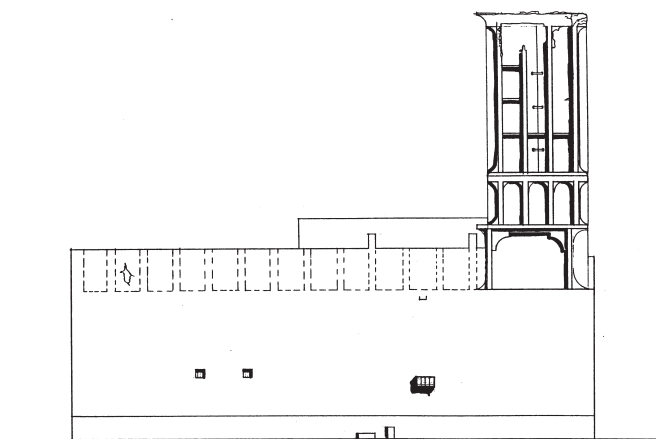
Mezzanine-floor plan



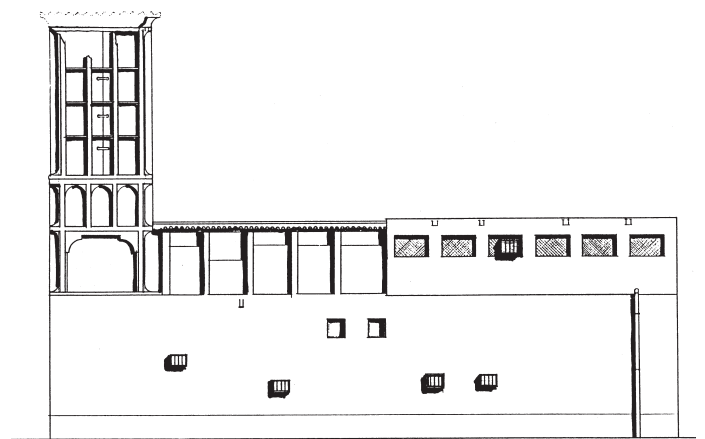
First-floor plan



Section looking south-east



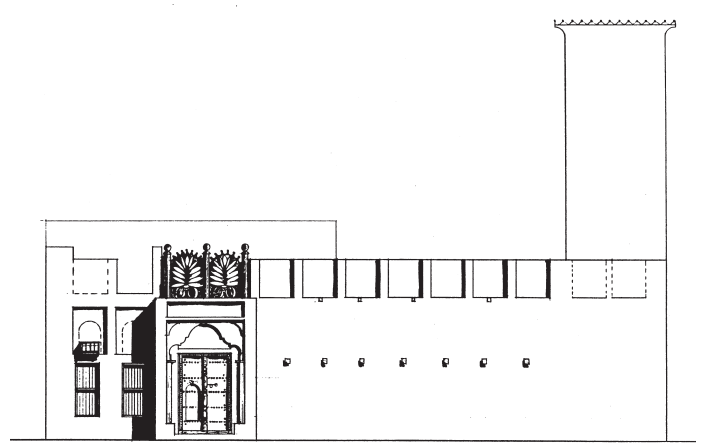
South-east elevation



South-east elevation

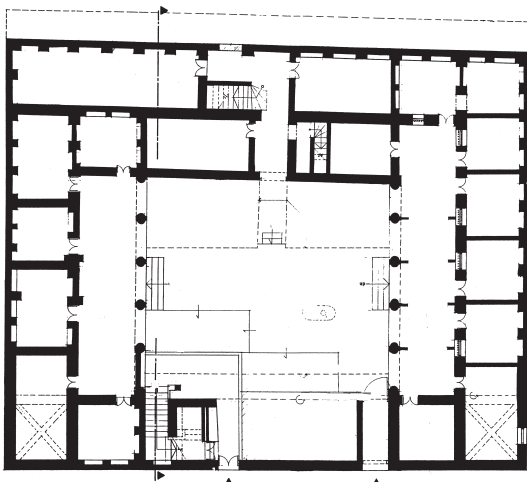


Above
North-east elevation of plot 122

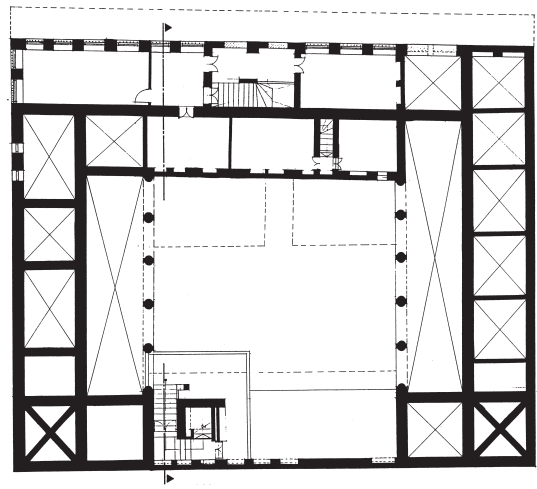


Above
North-west elevation

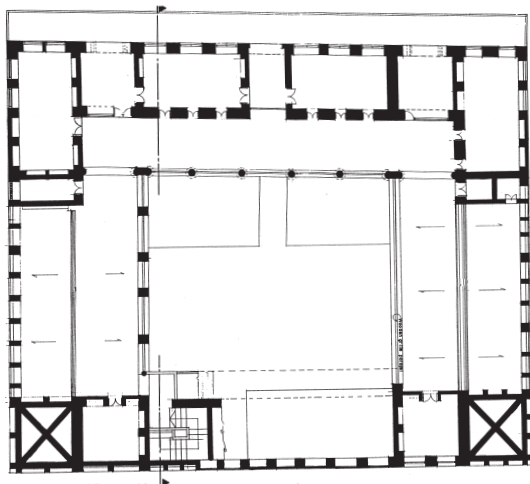
An Arabic café (restaurant), plot 121



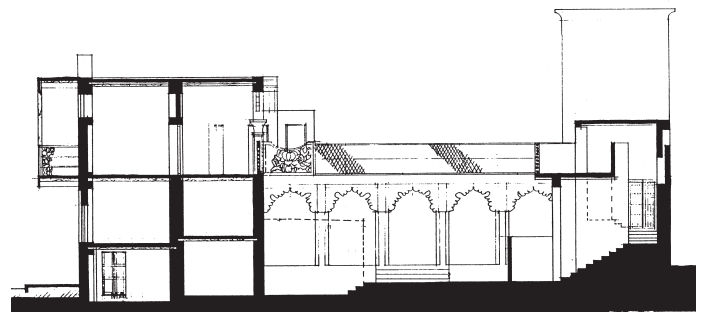
Ground-floor plan



Mezzanine-floor plan



First-floor plan

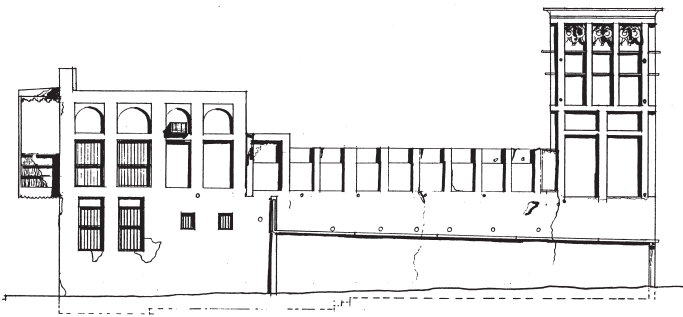
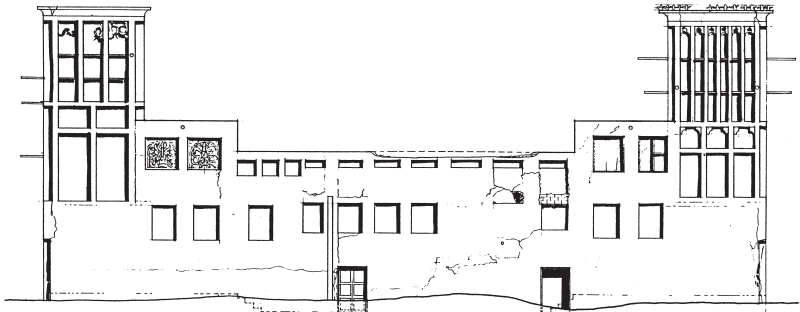


Section looking east

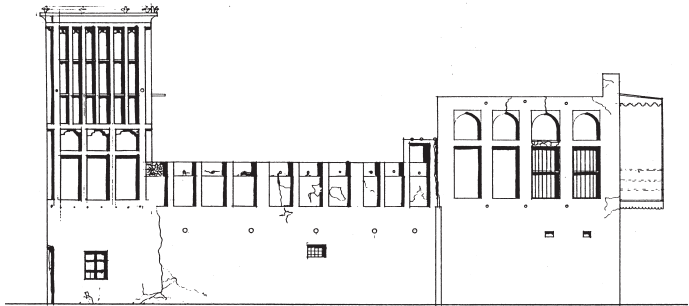
Right
North elevation



Right
South elevation

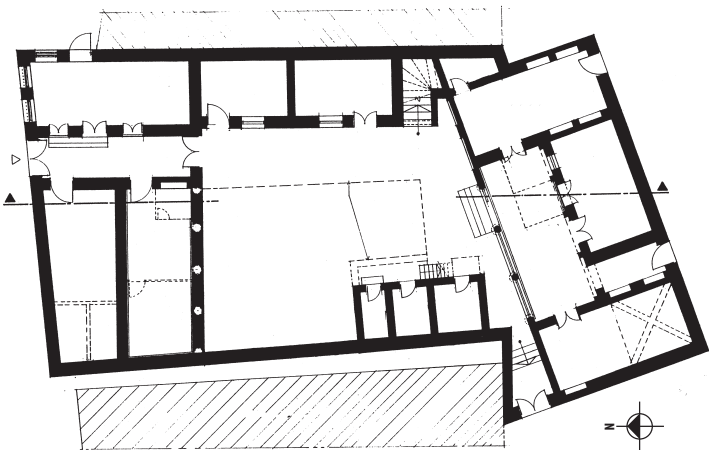


West elevation

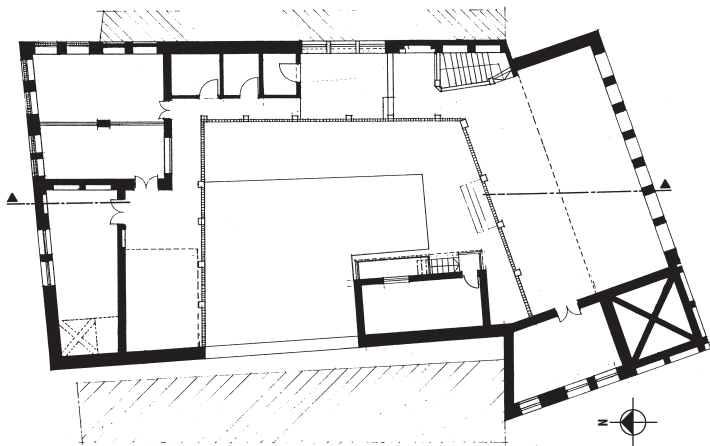


East elevation

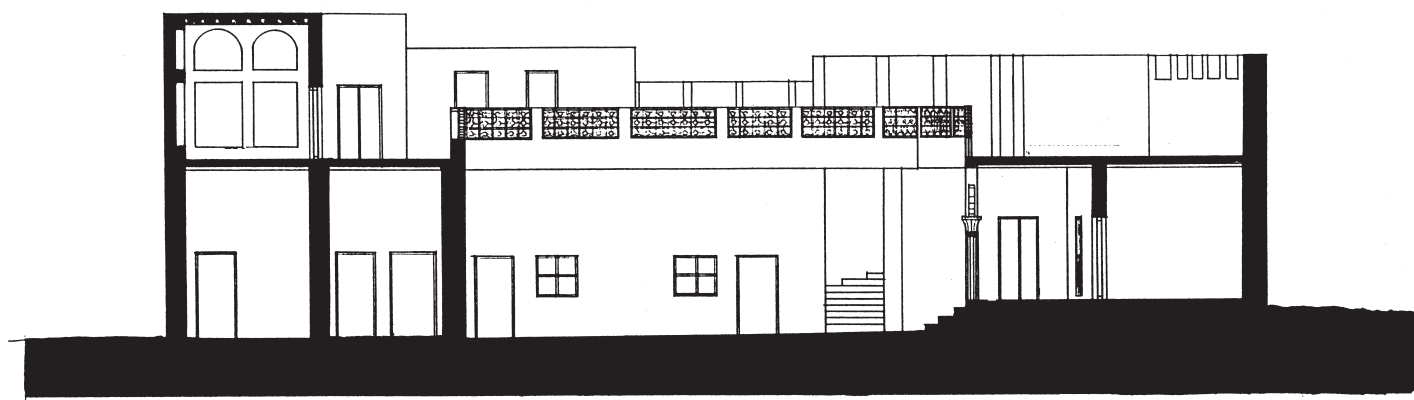
Shop and gallery, plot 87



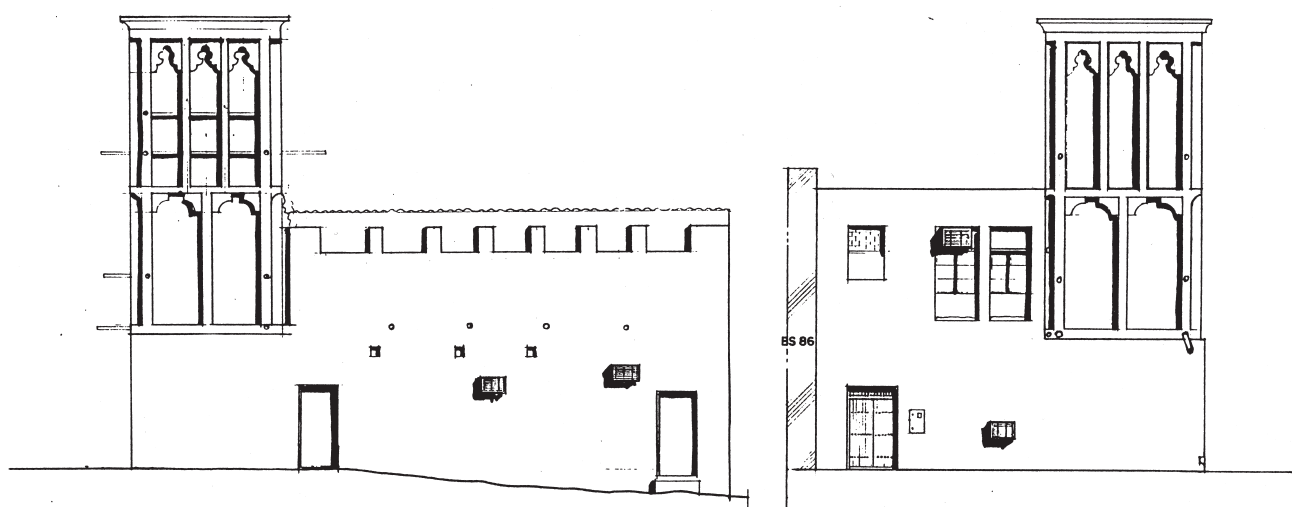
Ground-floor plan



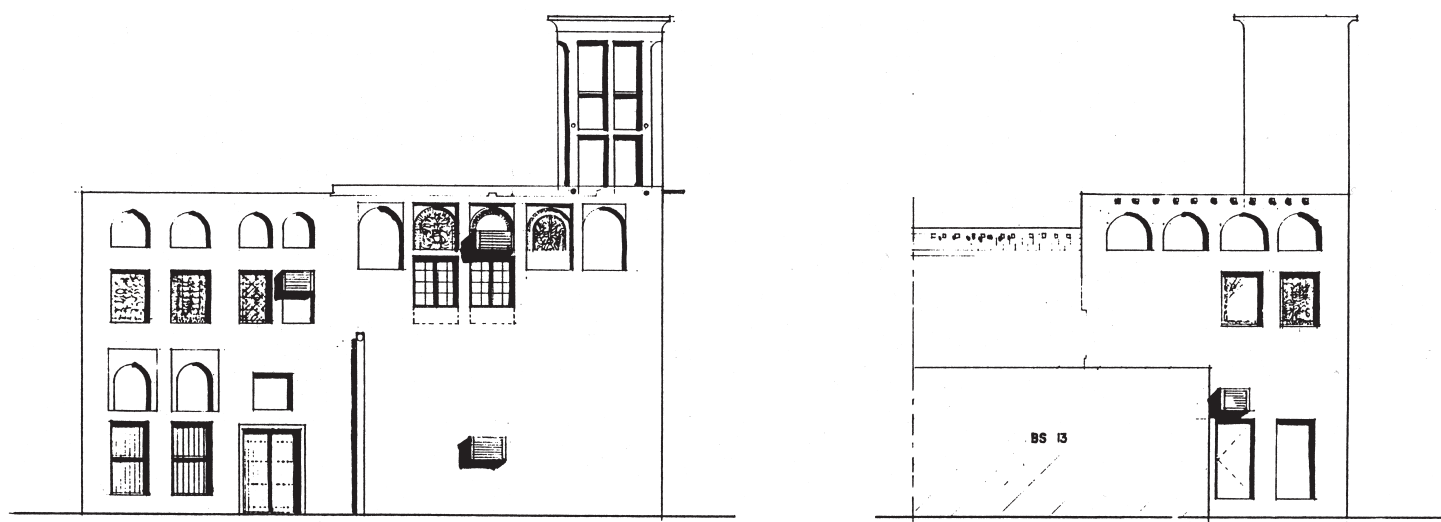
First-floor plan



Section of plot 87 looking west

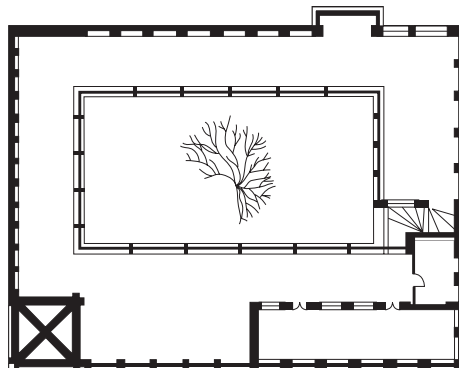
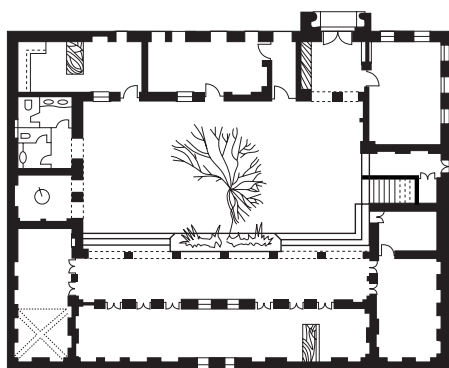


South elevation and south-west elevation



North elevation and south-east elevation

Cultural Centre, plot 69



Far left
Ground-floor plan

Left
First-floor plan

Al Bastakiyyah is at a crossroads; change is imminent. The long-standing threat of demolition has been lifted but it cannot continue as it is – the area is by and large a decaying slum. Many of the buildings are in bad structural condition;²⁶ they are being damaged by unauthorized changes such as *shandagah* structures; and the sheer pressure of over-occupation²⁷ is putting an intolerable strain on the buildings and the infrastructure.

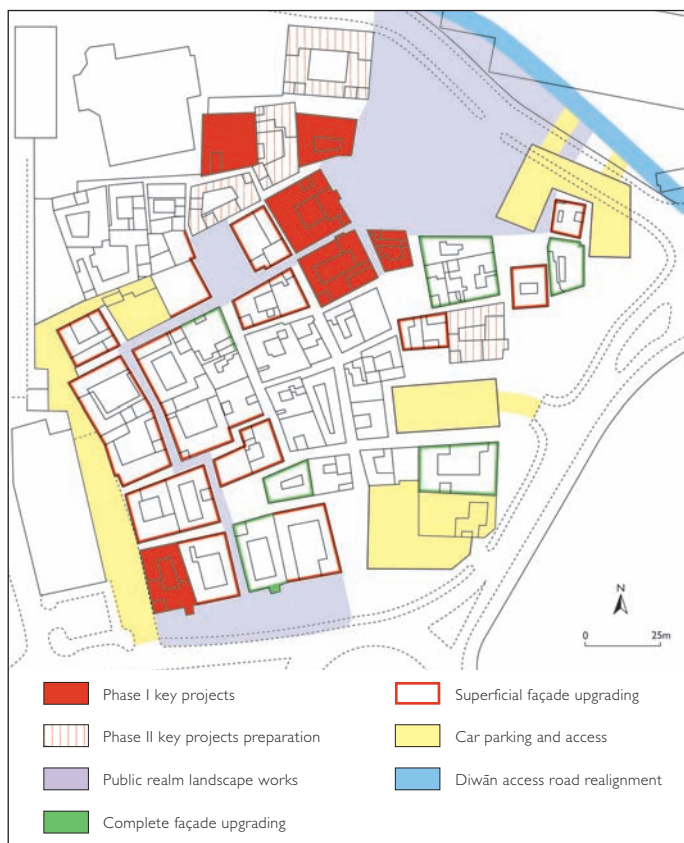
Acting as consultant for the Dubai Municipality in its current restoration project of al Bastakiyyah, the present writer has identified a strategy for the area's renewal with two basic elements. Firstly, the buildings and their surroundings should be carefully and subtly restored and adapted for modern-day use without radically changing the layout or appearance, with the overall aim of making al Bastakiyyah cleaner, safer and better cared for than it is at present. Secondly, there should be a balanced mix of activity in the area which should exploit the tourist and cultural potential of the area, reflect the current interest in occupying it residentially, and provide some commercial use to give the area continued life and variety.

In order to achieve this, the following proposals have been made: to create a main 'activity node' to the north, grouping a cluster of visitor attractions, museums, cafés, shops and galleries around the main open space looking out towards the creek; to add a secondary node of places of interest to visitors including the existing and successful Majlis Gallery to the south on the al Fahidi roads; to identify a visitor route throughout the area incorporating the *sikkahs* and little squares linking the two nodes in an interesting and attractive way; to

encourage predominantly residential use of the other restored houses; and finally to improve the setting on the outer edges of the area. Pedestrian links out of al Bastakiyyah will be: northwards to the creek and a revived Abra stop; north-west along the historic quayside in front of the Diwān; and west towards the al Fahidi Fort (Dubai Museum) and the *sūq* (along the al Fahidi road at present); and eventually to the Diwān parking area.

As part of this master plan, ten key projects in four areas have been identified: tourism and cultural projects – a windtower museum on plot 122, a restored house museum on plot 43, a tourist office on plot 13; other attractions – an Arabic café or restaurant on plot 121, a shop/gallery/café on plot 87 and a cultural centre on plot 69; restoration projects – the restoration unit's headquarters on plot 63, a show home on plot 71; and projects in the public realm – beautification landscaping, and the upgrading of services, utilities, parking and access.

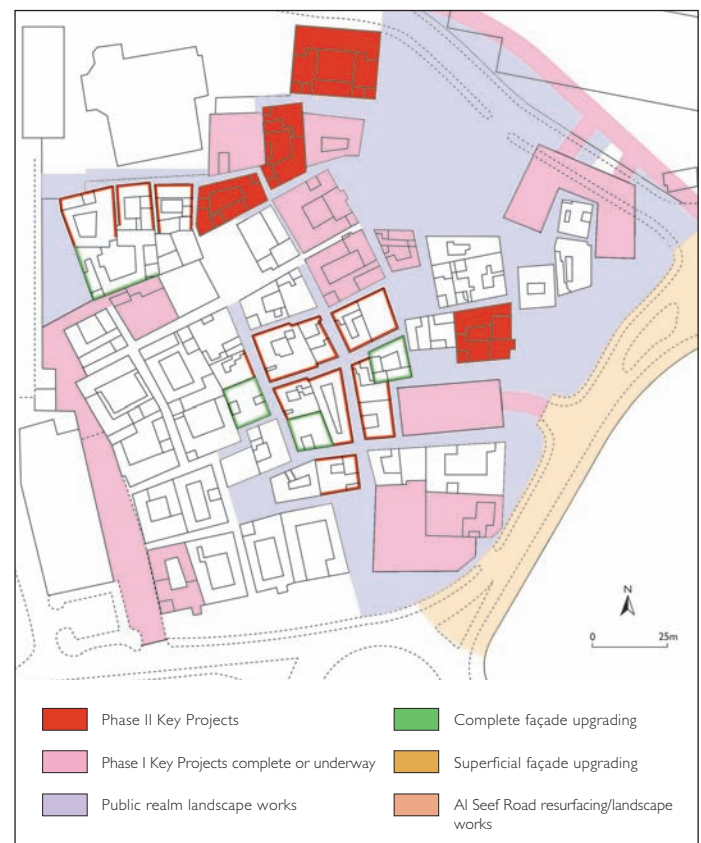
In addition to the master plan, a number of areas needing immediate action by the Dubai Municipality have been identified: acquisition of six key buildings needed for high-priority works; closure of eight residential buildings; removal of temporary residential structures and any that are causing damage to buildings; reduction of overcrowding; the setting up of new organizations, including a special al Bastakiyyah project team; new planning controls and design guidelines; parking regulations; general tidying up of the district; a public awareness campaign; and the undertaking of special studies of the creekside site, museum projects and the implementation of the overall plan.



Phase 1 projects

Once these have been addressed, a phased programme will then be embarked on, principally in developing the key projects. The first phase, the main elements of which are shown in the illustration above, has three main purposes: to create an attractive tourist route through the area with at least one visitor attraction at the northern (creek) end; to make it apparent to property owners and potential investors that al Bastakiyyah's decline has ended and its revival has begun; and to demonstrate the high standards in design and workmanship in all work carried out. In the second phase, which began in 1986 and is shown in the illustration opposite and on the right, the aims are to complete the landscaping and façade restoration on all the *sikkahs*; to add further visitor attractions, mainly in the northern part; and to restore other worthwhile buildings not included in the first phase.

Property owners and potential investors, as well as the Dubai Municipality, have an important rôle in this strategy. The reasons are twofold: firstly that conservation and revival of the area will be more soundly based and



Phase 2 projects

longer lasting if it is motivated by individuals and businesses rather than simply public officials and consultants; and secondly that the private sector is already interested in investing in the area. The rôle of the Municipality should be in initiating the process, carrying out key projects as part of the immediate action plan and ensuring high standards in the work carried out by both public and private sectors. At present, Dubai Municipality has upgraded all the services, utilities, parking access routes to al Bastakiyyah, and all the *sikkahs* have been resurfaced with stone. The windtower on plot 69 has been rebuilt and restoration of plots 63 and 121 has commenced.

As work continues, there will be tangible returns: a better tourist centre leading to increased visitor spending; a livelier and more attractive city centre; and historic buildings will have been given new uses and made viable in the long term. Less tangibly, the city and people of Dubai will be able to take pride in their uniquely fascinating and cosmopolitan heritage.



THE ANCIENT MOSQUES OF RA'S AL KHAYMAH

Didier Willems

Introduction

Religious architecture has been sadly neglected by the literature concerned with the countries of the Arabian peninsula, and particularly the southern coastal regions of the Gulf.¹ Faced with the increase in modern developments, the authorities in the region are becoming aware of the value of their heritage.

Architecture, a barometer of the evolution of a society, has always had the ability to be a public representation of ostentatiousness or simplicity, providing a reflection of political or religious ideology, philosophy, or the way of life or ambitions of a particular social class or community. Mosques are no exception to this rule. A comparison of the numerous different types of mosque, be they Ottoman, Iranian, Mozabite or Yemeni, would be enough to make this apparent.

In the geographical area that constitutes the United Arab Emirates, one's eye rapidly turns towards recently constructed developments, the majority of which demonstrate interesting artistic expression and technical expertise. To refer only to these examples, however, would be to exclude a collection of ancient buildings that form an equally valid part of the national heritage. As a result of the changes and metamorphoses that have taken place on the southern and western coasts of the Gulf over

several decades, this legacy has been increasingly neglected to the point of being largely abandoned.² It is clear that the resuscitation of these monuments would create an added tourist attraction but, most importantly, they are a national treasure that must not be forgotten. Thanks to a few who have acted in giving assistance to research and/or restoration work, these edifices are 'reviving' and revealing aspects of themselves that have not hitherto been seen.

The reasons and aims for undertaking a detailed study of the mosques of Ra's al Khaymah were the rapid deterioration of ageing mosques; lapsed maintenance, desuetude and climatic conditions are accelerating the process. The architectural profusion of the Ra's al Khaymah Emirate provides numerous examples to back up this statement. Among them is a small mosque (no. 6) situated to the east of the main trunk road between Rams and Dāyah, where more than half of the *qiblah* wall has collapsed in under a year (illustrated on p. 206); any useful clues for the interpretation of the structure's evolution have thus been dragged into oblivion. Buildings, even those of religious significance, can also disappear due to the direct interference of the inhabitants, for example because of the reuse of building materials. One

such case can be observed in the Raybiyyah wadi, east of Falayyah, where the stones were reused in the construction of a sheep pen.

In order to tackle this situation, surveys were carried out in the northern territories of Ra's al Khaymah with the permission of the Department of Antiquities and Museums. The goal was to establish the feasibility of a comparative study of the Emirate's antique mosques.³ Without attempting to draw up an exhaustive list of all the mosques (which would have been an impossible task in the time allotted), more than thirty buildings were nevertheless registered using predetermined selection criteria. They had to be old and endowed with certain characteristics relating to their structure, their layout, the materials and building techniques used, as well as

any possible ornamentation.⁴ The majority of these monuments date from the nineteenth and early twentieth centuries, while some could have been erected two or three centuries ago, and the first phases of that at Julfār date from much earlier.

Some more recently built mosques were also recorded, because they occupied an antique site or because they bore witness to the endurance or adaptation of a particular characteristic.⁵ Constantly changing influences, such as population shifts, have been an obstacle to the finding and recording of concrete facts. Indeed, the people living close to old mosques are generally ignorant of construction, since they are not usually native to those parts. This is not always the case, however, with sites in the mountains.

General and individual characteristics, related to the architectural style and form, as well as their possible origins will become clearer; some of these may be related to historico-religious events (the adoption of a particular religious order or tribal conflicts) and some to important socio-economic ones (population shifts or commercial influences).



Left

Ar-Rams/Dāyah, mosque no. 6: qiblah wall in 1995

Below

Qiblah wall in 1996



Historical and geographical context

Being on the western coast of the Omani Peninsula and close to the Hormuz Strait, Ra's al Khaymah⁶ soon became a centre of activity, and a region coveted by the presiding administrations of its neighbouring countries that witnessed the Persian, Omani and Portuguese occupations.

Islamized since the first century of the Hijirian era, the future Emirate underwent several historico-religious perturbations. Among these were the Qawāsim takeover⁷ and the expansion of Wahhābism during the eighteenth century (twelfth century AH). According to W. Dostal,⁸ the establishment of Wahhābism would become the reason for the removal of many religious buildings. Equally, the constant influence of the Sultanate of Oman, which belonged to the Ibādite denomination, and

trading relations with Iran, predominantly Shi'ite, could not help but make an impact on the society.

Migrations, often connected with the aforementioned phenomena, were also a considerable factor, whatever their scale. It was in this way that members of the Za'ab tribe, originally from Oman and having mainly dwelt in Jazīrt al Ḥamrā,⁹ would have settled in Khaṭṭ¹⁰; the Qawāsim¹¹ influx provides another example. It is regrettable that there remains hardly any trace of their impact.

Finally, the tribes occupying the mountain ranges, which constitute the Omani headland, belonged mainly to the Shiḥūḥ tribes. All these societies traded with each other between the two coasts of the peninsula.

Materials and methods: two fundamental parameters

Part from temporary areas of worship, the place of prayer is realized either as a sacred space reaching up to the open sky (*muṣalla*), or as a covered room (*masjid* or *jāmi'*). The difference between the *masjid* and the *jāmi'*, not always clear in translation, has to do with the function of the particular mosque. *Masjid* normally designates a mosque for use of the faithful in carrying out their daily obligations. The *jāmi'* is distinguished from the *masjid* by its essential rôle in Friday afternoon general assemblies for the congregational prayers, which require the presence of a pulpit (*minbar*) for the preaching of the sermon (*khuṭbah*).¹² Conveniences are usually provided close to the mosque. The size of these buildings can vary,

depending on the size of the community that uses them. Nevertheless, the *jāmi'* is often more spacious since it attracts a greater number of worshippers. The people who took refuge in the mountains or lived there in the dry season would often come down to the lowlands. In most cases, Friday was an opportunity to carry out business affairs and also, more importantly, to attend this weekly congregation.

What is most impressive about these mosques, erected over the centuries, is not so much their simplicity, nor any sumptuous decoration, but more the judicious use of the materials available in the immediate surroundings. This traditional craftsmanship has, however, always

allowed for innovations derived from the builders' backgrounds, new technical know-how, outside influences and 'ideology'. This indigenous religious architecture could be summed up using certain key words: simplicity, diversity and practicality.

During the conducted research, certain examples revealed specific describable characteristics, which were related to specific factors. It became clear that geographical context was one of the most important. Indeed, this determined which materials were used. There are some differences that occur because of the age or location of the buildings, but categories were drawn up based on very particular variations. Each criterion used could give rise to a group whose members only differed from each other in very minor ways; a detailed study should start to draw these distinctions.

In concrete terms, the Emirate of Ra's al Khaymah can be divided, from east to west, into three separate areas of altitude: the mountainous region, the plains and the coastal strip. Each of these provides a type of mosque (*masjid* or *jāmi'*) showing particular characteristics.

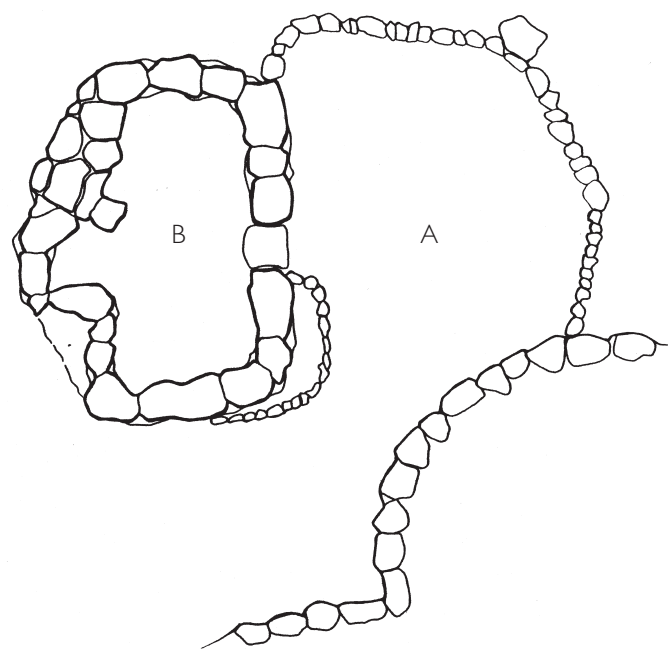
It is easy for the observant viewer to draw distinctions between these constructions using only certain points of comparison, such as layout, size, position in relation to surroundings, or whether the materials used are traditional or modern. This can however be pushed further, without delving too far into minutiae.

The materials and the consequent simplicity of their use are two of the principal features of native ancient religious architecture. In the framework of this research it is understood that we are not talking of modern innovations and expertise, such as the introduction and integration of materials like steel and reinforced concrete.

The nature of the ground had a comparatively immediate effect on design as it forms the base of the building. Thus the difference between the styles in the mountains and on the coast had as much to do with the materials available to the builders and aesthetic concerns, as it had to do with the function, size and layout of the building; there was little opportunity for variation.

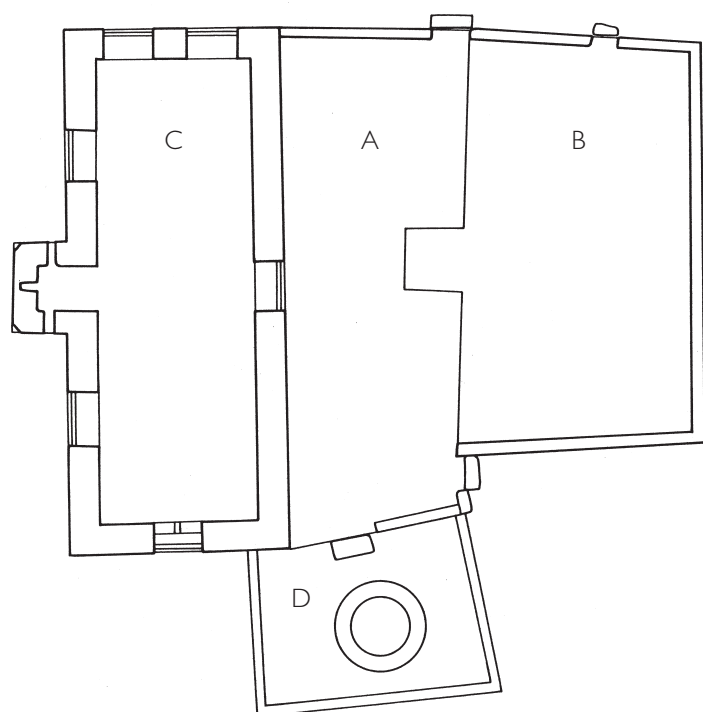
The architecture of the plains and coastal area is more refined as it was installed in busy public and

residential areas where people from all backgrounds rubbed shoulders, whether they were settled, nomadic, or just passing through. Some mosques were small complexes comprising a prayer room, a portico, a worshipping space with an open roof, washing facilities and, in exceptional cases, a minaret. 'Microcosms' formed by families created small clusters within the cities; these, in effect, were nothing less than small villages. Just as one place of worship sufficed in each mountain village, so the *masjids* and *jāmi'*s were abundant in the plains.



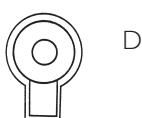
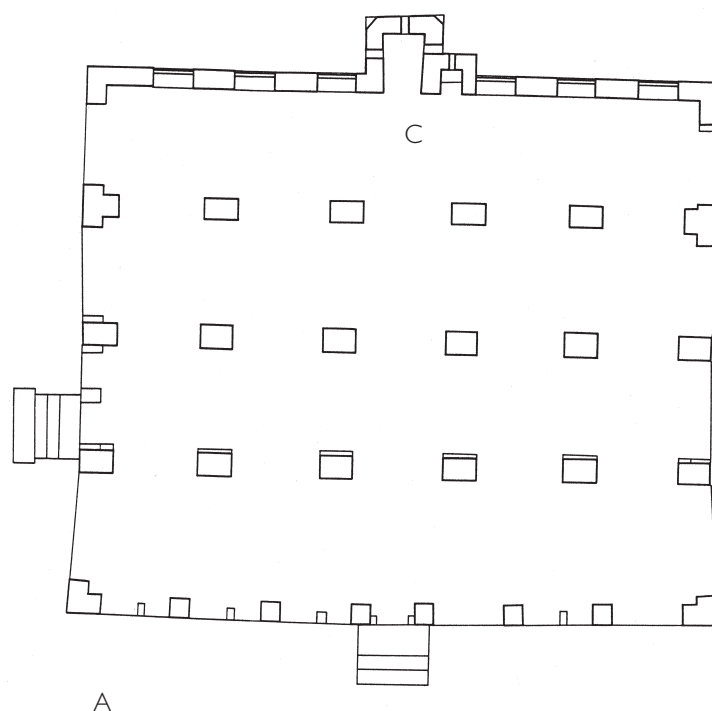
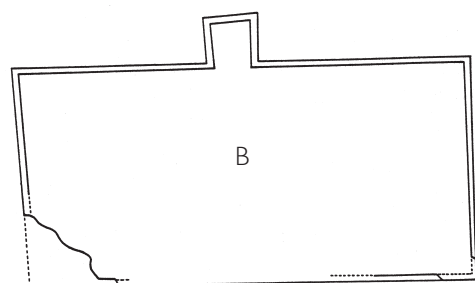
Above

Wadi Ghalilah, mosque no. 31: general plan. An esplanade (A) leads to the praying room (B)



Left

Al-Hail, mosque no. 11: general plan. This masjid includes a courtyard (A), open-air praying area (B), the mosque (C) and a well (D). Generally, the masjids have only simple rooms



Above

Ash-Shimal/Ghubb, mosque no. 34: general plan. A vast esplanade (A) gives access to the open-air praying area (B), the main mosque (C) and the use of the well for the convenience of ablutions (D). Sometimes, masjids and jāmi' are fronted by a portico; in this case, this space has probably been included in the covered praying room

Materials

The geographical context determined the type of materials utilized in the construction of a monument, or even of a village in its entirety. The mountains provided rock and thorn trees (probably the *'ilb* or *sidr*, *zizyphus spina christi*); in the plains it was more rounded stones from the river beds, and/or brick as well as thorn trees and palms; along the coast, coral was put to use.

Their morphological features defined the way in which they were put together. Thus, very angular stones could be used without any mortar and permitted the construction of 'dry stone' walls, only requiring clay to plug the gaps. On the other hand, more rounded stone had to be sealed with mortar. As for brick, that needed a binding agent such as wheat chaff mixed with the clay.

In contemporary structures, *ṭābūq* (brick made with sand mixed with seashells), breeze-blocks and, more recently, reinforced concrete have made an appearance. These materials have the advantage of being able to be measured and shaped, assuring a great deal of flexibility, at the same time as needing less maintenance. It is not uncommon to find mosques containing samples of all these materials, bearing witness to various modifications and restorations. The facility of these materials to come in any shape or size is probably at the root of their ubiquity. They do, nevertheless, pose certain problems that should not go without mention. The incompatibility of materials or the poor quality of their ingredients can cause, over the long or short term, a deterioration in the structure in which they are used. The small mosque in al Falayyah is a case in point: restored in the 1980s, using traditional materials in combination with modern ones, such as cement, it has suffered from several leaks which have given rise to rot. The fact that it is no longer used for its original purpose is to blame for this state of disrepair. The very composition of reinforced concrete causes decay; saltpetre quickly collects at the base of walls and the water contained therein sets off an irreversible rusting of any metal framework. The result is a structure that starts cracking all over. One of the mosques in Jazirt al Ḥamrā provides a perfect example.

In some buildings, such as the great mosques of Shimal/Ghubb and in Ma'yarid (no. 22), the



heterogeneous stonework provides its own account of the phases of construction. In actual fact, the use of each material corresponds to particular extensions or repairs carried out during the particular lifetimes of these edifices. The identification of materials and techniques used in a building is, in itself, a way of discovering its individual story.

Wood, untreated or otherwise, is still a favoured element in supporting structures, whether it be in lintels (although stone ones are not uncommon), roofing or window frames.



Opposite top
Falayyah, mosque no. 2: view of the mankrūr (palm matting)

Opposite middle
Jazīrt al Ḥamrā, mosque no. 4: view of the eastern façade in 1996. The reinforced concrete has not been the best choice; it has split because of the metal becoming oxidized

Opposite bottom
Ash-Shimal/Ghubb, mosque no. 34: the oldest elements were constructed with traditional raw materials and the renovations have been made with modern materials such as concrete bricks for the roof

Methods

In the mountains, rock is the material of preference. Provided directly by the environment, it comes in various sizes; the bigger stones are used for the underlying foundations. The assembly involves no mortar; the ridges on the stones provide a system of self-support.



Above
Khaff, mosque no. 9: three stones are used for the lintels of this little opening in the qiblah wall

Top right
In the south of Wadi Haqil, mosque no. 30: the technique of 'pierres sèches' is frequent in mountainous regions. Their sharp edges create a natural rubble

Right
Wadi Ghalilah, mosque no. 31: branches cover the mihrāb (praying niche)



Top
Wadi Ghalilah, mosque no. 31: view of the external face of the qiblah wall. The building techniques used for the roof of the mosque are similar to those used for the rest of the village. The roof is equipped with a stone cornice



Above
Mosque no. 26: the covering of the mihrāb was made by lying flagstones on two corbelling faces with a smooth profile

The mosque walls are windowless; the only opening is the entrance door. Any unwanted chinks are filled with a mixture of clay and soil. The floor, made from hard-packed earth, is often on a level lower than that which surrounds the building.

The roof is made from thorn-tree trunks onto which branches are attached; these are then covered with a mixture of earth and small stones. This covering is also used for the *mihrāb*; in some cases the roof is a corbelled construction of stone. Some mosques, following the example of civil architecture, are corniced with flat stones.

In the lowlands, an area that is more vulnerable but less hostile, stones from the wadi and bricks are utilized. Wadi stone has the appearance of rounded rubble, and needs a binding agent like clay, lime or cement. Combined with different woods and coatings, it lends itself to being used in partitions in larger spaces, fundamental to the Friday midday worship. Along the coast, construction techniques hardly differ from those practised in the nearby plains. The most common technique is that which is referred to as 'layer construction', to be seen throughout the Gulf region. The principle is one that involves building the walls of a structure by putting successive courses one on top of the other, in layers that are plainly visible. The stones are covered in lime, and then covered in a coating similar to mortar. This lime can be derived from blocks of coral that undergo a slow-burning process; this explains the common presence of wood charcoal in the mortar. Each course adds an average of another 25 to 30 centimetres.

In most of the buildings that were studied the walls are hardly, if at all, interbuilt. This immediately explains the separation at the corners and, hence, the accelerated erosion. The *qiblah* wall had to be erected first in order that the north- and south-facing walls could lean on it. The Great Mosque of Faḥlayn is interesting since the construction methods used there are oddly similar to those adopted in the main mosque at Manaḥ in the Sultanate of Oman.¹³ The production of Gothic arches on columns, lending an element of decoration to the building, is a major feature which leads one to consider the possible origins of this influence.



Mud brick and sand brick have only been observed in rare cases: two excavated mosques, one at al Maṭāf/Julfār¹⁴ (no. 1) and the other in the Shimal region (no. 35).¹⁵ Their ruins date back several decades. As much as the fourth phase of the mosque at Julfār can be characterized by the radical switch to stone combined with mortar,¹⁶ so the continued use of mud brick in the second mosque is undeniable. From the examples of the buildings that were catalogued, it seems unlikely that brick bases would have been used to support constructions of stone, despite the abundance of the material in the region. Where the *miḥrāb* has come away from the mosque, a split in the wall has appeared. This is also in mud brick, but of a dark brown colour. It would appear to be some kind of repair or reinforcement.



Top left

Ar-Rams/Dāyah, mosque no. 6: southern corner. The masonry of stones held by mortar clearly shows the 'layer construction' technique

Left

Faḥlayn, mosque no. 3: arches separating the second bay from the qiblah bay

Above

Ash-Shimal, mosque no. 35: all the walls were erected with mud bricks and clay

Construction methods making use of brick and/or stones bound with mortar coexisted. The use of compound materials is not unusual, but might have been reserved for fortified buildings.¹⁷ As D. Kennet writes, 'It is true that the earth and wood stockades described by de Albuquerque may only have been emergency defences erected to repel the Portuguese threat but it is also possible that mortar was not very commonly used as a building material in the Musandam area in the centuries before the arrival of the Portuguese.'¹⁸ That the use of mortar became more widespread with the arrival of the Portuguese should not be ruled out, but if it is a reason for the adoption of this technique, then it is not the only one. There is an equally valid physical reason. Stones with sharp edges are held together by natural forces; this is not the case with wadi stones. The type of material used justifies the application of one technique in preference to another.

The walls accommodate niches and/or openings on the upper levels. The windows are four sided, wide and closed by means of wooden shafts which are positioned horizontally; in mosques which have undergone conversions, these have wooden frames, are wire-meshed,

and normally furnished with four small shutters. These shutters protect the sacred space from evil eyes and animals, but also from bad weather. It is interesting to note that the biggest windows are positioned on the south and west faces in cases where there is no natural barrier against the climatic influences of the Gulf and the mountainous regions, which are to be found to the north and to the east. At the base of the frames a small hole allows drainage of any water that might have leaked in or been spilt in cleaning.



Above
Khatt, mosque no. 9: thick branches or tree trunks are used as a grating to stop intruders

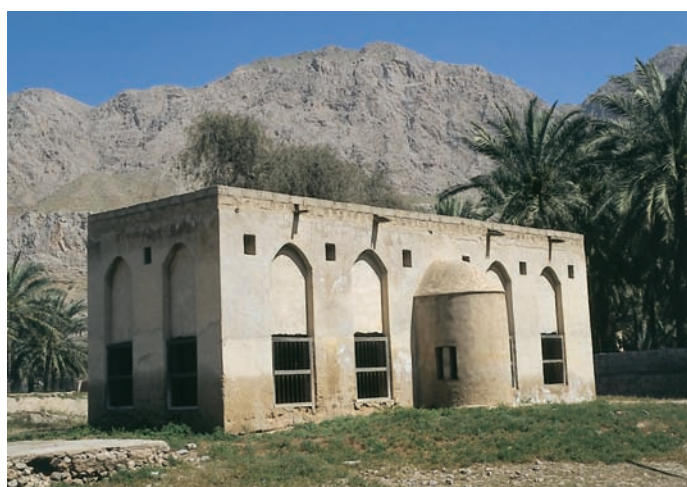
Above right
Al-Hail, mosque no. 11: the latticed windows are of the same size and have four shutters

Right
Falayyah, mosque no. 2: one little opening is made in each side of the mihrāb. This peculiarity occurs in many buildings



The *miḥrāb* is placed in the centre of the *qiblah* wall against which it is built up or with which it is interlocked. It normally has a little opening on each of its sides. The covering of the niche was traditionally carried out in three different ways: with a semicircular or ribbed vault, with a single-sloped or double-sloped roof supported by flat stones or boards. This is manifested on the exterior as a half-dome or a stepped slope.

For the most part the floors are hard-packed earth or gravelstones covered with a layer of lime or, following repair, cement. The spreading of concrete is also used to facilitate the support of blocks forming the foundation of a raised floor (Ra's al Khaymah, no. 13).



Left top

Al-Hail, mosque no. 10: view of the qiblah wall from the south-west. A half-dome covers the pointed-barrel vault of the miḥrāb

Left

Ḍāyah, mosque no. 21: a half-dome covers the miḥrāb. In this example, the windows recall its shape

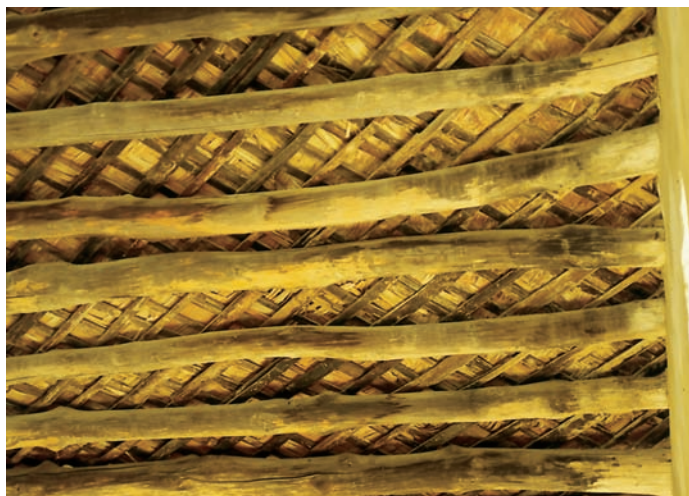
Top

Ghubb, mosque no. 14: the external profile of the miḥrāb was built with steps

Above

Ra's al Khaymah, mosque no. 13: the door between the old and the new mosque. The stairs and the floor of the second monument were made with concrete; they are probably stabilized on an embankment which could explain the differences between the levels

Palm trees, thorn trees and mangroves are the most exploited species of wood. Sawed into half-trunks or planks, or left uncut, they are suitable for lintels or the *mankrūr*.¹⁹ Trunks used as beams are being progressively replaced by rough-cut cross pieces.



Left top

Ḍāyah, mosque no. 21: tree trunks support *mankrūr* (palm matting)

Left middle

Ma'yarūd, mosque no. 22: squared wood and batten take the place of traditional beams and *mankrūr*

Left bottom

Ḍāyah, mosque no. 24: this mosque shows an example of a single slope which drains off rain water towards the eastern entrance façade

Right top

Khaṭṭ, mosque no. 9: view of the double-slope roof from the southern façade

Right middle

Ash-Shimal, mosque no. 7: terracotta gutters drain rain water towards the qiblah wall

Right bottom

Ghubb, mosque no. 8: the roof of this mosque has two slopes; wooden gutters drain off rain water

Rain water is generally drained towards the *qiblah* wall. One of the shrines in Ḍāyah (no. 20) and one in Jazīrt al Ḥamrā (no. 4) are isolated cases where water runs towards the side where the main entrance is located. When the roof is double sloped, the water runs along the two sides; the *jāmi'* at Khaṭṭ follows exactly this model (no. 9). The drains are made in hard clay or wood in older cases, or in zinc in more modern examples.



As indicated at the beginning of this section, a mosque can have temporary status. One place of prayer was erected on land reserved for shepherds, between the main road going from al Nakhil to Ra's al Khaymah and the bay on the edge of the industrial zone on the north-east side of the capital. Following the simple design of beams supporting a *mankrūr*-type roof, it was destroyed between May 1996 and April 1997.

Finally, it seems appropriate to discuss some of the peculiarities that can be seen in certain mosques. A few hundred yards south of the Great Mosque of Ra's al Khaymah there are, in the middle of one of the old neighbourhoods, the vestiges of a small city mosque (no. 13), now going under the name of the Sayyid Mandany *jāmi'*. It is undeniably distinct from the extension which has been constructed against its eastern wall. It has been completely abandoned in favour of this larger building which has been built from concrete blocks; a passage has been left between the two. They are

Left

Ra's al Khaymah, mosque no. 24: the praying area was simply built with concrete for the floor and thin wooden beams to support the matting

Below

Ra's al Khaymah, mosque no. 23: the recently built mosque (in the background) adjoins the eastern wall of the old one. Its façade is higher and is ventilated by nine openings (bād gīr)



diametrically opposed to each other in terms of materials and building techniques, as well as cooling systems; the older one has a *bād gīr*²⁰ and the more recent construction is furnished with air-conditioning. The eastern wall, where the original entrance was, presents a mystery: the ground floor has two doorways, one of which has been blocked up, and the upper level has its own *bād gīr*. It would appear that this upper level belonged to a building that stood in front of the original small mosque: either an enlargement or extension of this latter, or an adjoining building whose function is now totally unknown.

The two specimens that were accepted onto the list in the ancient town of Jazīrt al Ḥamrā demonstrate clearly the alterations that were carried out over the course of time; these consist of numerous additions to the original kernel of the building, the rôle of which has not been changed at all. In the mosque situated in the middle of the settlement (no. 4), the prayer room was built on top of initial foundations, which are visible from the south side. Following this, a reinforced concrete portico and an area for ablutions, made from breeze-blocks, were added. In the second building (no. 17), the oldest phase can be observed in the northern and southern walls, on the interior as well as on the outside. Likewise, some traces of pilasters and the edges of the original roof have not entirely disappeared.



Top

Jazīrt al Ḥamrā, mosque no. 17: the southern wall (in the background) shows an earlier part of the building which is visible past a pilaster and what is left of the roof

Above

Jazīrt al Ḥamrā, mosque no. 4: a portico and an area reserved for ablutions have been attached to the praying room. These additions were built with modern materials such as *ṭābūq* (bricks full of shell fragments) and concrete

Below

Jazīrt al Ḥamrā, mosque no. 4: old sections are visible within the south façade



Decoration

Generally speaking, there is no ostentatious decoration and it is not a major concern. This fact means that it has been of marginal interest, a field of little importance or one for a smaller or more intimate study. Among the mosques researched, only a few offer a small amount of ornamentation; this shows itself in a number of ways.

The first genre of decoration is in slight architectural variation; this might consist of arches or columns, as in the Great Mosque of Faḥlayn (no. 3), which is one example. Polygonal pillars with curved chamfers and intrados on the *miḥrāb* and *minbar*, such as those in the Great Mosque of Khaṭṭ (no. 9), also contribute to the charm of the prayer space. The arches covering the prayer alcoves and the *minbar* can be in vaulted, ogival, basket-handle or foiled styles.



Above

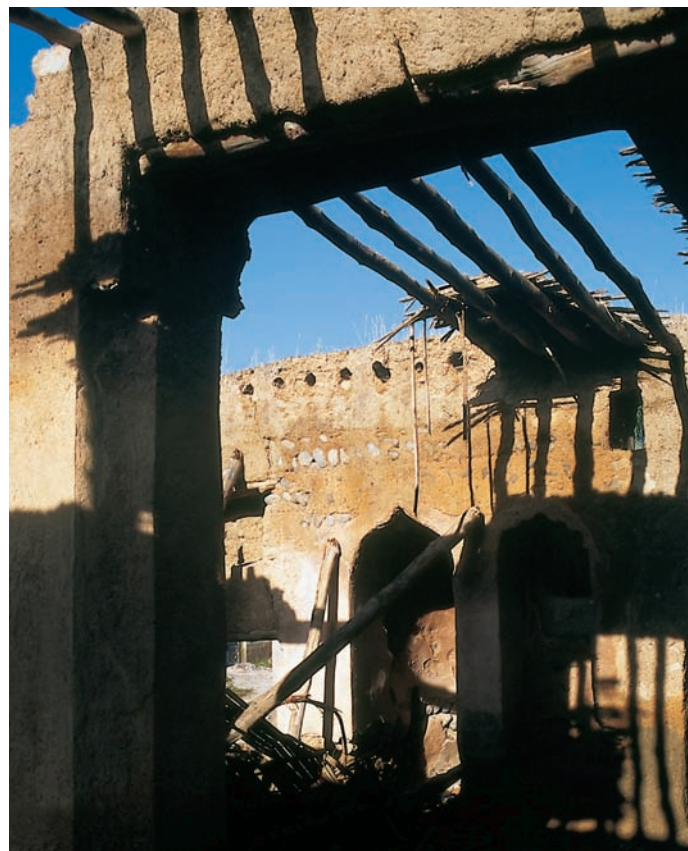
Faḥlayn, mosque no. 3: bays are separated by a line of pointed and multifoil arches which rest on circular columns

Right top

*Khaṭṭ, mosque no. 9: the arches of the *miḥrāb* and *minbar* and the shape of the columns are elements which create a pleasant atmosphere in the *jāmi'**

Right bottom

*Ma'yarid, mosque no. 22: making holes in the *miḥrāb* permits the sun to enter the space but produces chromatic effects also, not necessarily wanted at the outset*



These types of ornamentation are not the exclusive privilege of the *jāmi'* but are, at least in the examples studied, ancient work. The more recent technique, involving the ornamentation of the sides of the *mihrāb* or the *qiblah* wall with open-work, makes judicious use of light for practical purposes and creates a chromatic atmosphere.

The second genre is that of added ornaments. The most representative of these are sculpted geometrical decorations on the doors (al Ḥa'il, no. 23, Jazīrt al Ḥamrā, no. 17, or Ḍāyah, no. 21). The designs vary, but are always based on the interweaving of rectangles, diamonds and sections of a circle. In one of the mosques in al Shimal, a border decorated with vegetable and geometrical motifs has been salvaged in order to preserve its related function as a lintel.



Above

Ash-Shimal, mosque no. 15: a wooden border decorated with floral and geometrical patterns has been retrieved to serve as a lintel

Right

Ḍāyah, mosque no. 21: as with other monuments, the door is the principal expression of decoration

Far right

Ḍāyah, mosque no. 20: the centre of the door transom was once filled with green moulded glass



The introduction of new materials, such as moulded and tinted glass, placed in the surroundings of doors (Ḍāyah, no. 20), prefabricated partitions or embedded in cement for pictorial decoration, such as the configuration portraying what is likely to be Makkah in one of the *masjids* in Ḍāyah (no. 20), is another creative resource. The standardization of such materials has given rise to an increase in their use.

Finally, a small number of inscriptions have been noted; these, however, are more recent. They consist of quotations from the Qur'ān, or simply of graffiti, and not of anything that is informative in terms of the building itself; mosques nos. 22 in Ma'yarid and no. 21 in Ḍāyah are two such examples.





Above
Ghubb, mosque no. 14: detail of the north façade. All the openings are obstructed with prefabricated claustra

Top right
Ḍāyah, mosque no. 20: this dome and the two minarets could be a representation of Macca, the Holy City towards which the miḥrāb faces



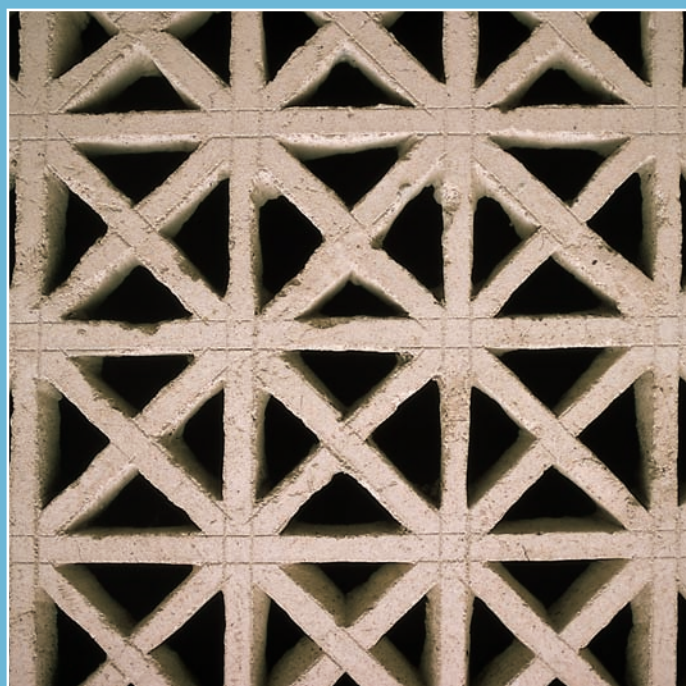
Right
Ma'yarid, mosque no. 22: the inscription is the shahada (profession of faith, one of the five pillars of Islam): 'la ilaha illa Allah [wa] Muhammad rasuluhu' which means 'There is no other god than Allah and Muhammad is His Messenger'



Conclusion

Across the simple range of ancient mosques in the Emirate of Ra's al Khaymah there emerges an obvious symbiosis that exists between the construction of the edifices and their geographical context. The environment dictates the main building material. Simple, yet satisfactory, techniques have been put into practice according to the space available and the rôle that the mosque has been designed to fulfil. It is necessary at this point to note the opinion of W. Dostal who concludes that '... in accordance with Wahhābite tradition, the mosques are rectangular buildings constructed with intended simplicity'.²¹ In the absence of tangible examples, this piece of wisdom might not seem to be out of place; but in fact, certain mosques displaying these typical characteristics (as in Julfār) would have been constructed before the Wahhābite influence. One could conclude that the nature of the religious sect is of

secondary importance to the original mosque form or plan. The degree of simplicity is apparent on two levels: on a general level, and according to location. If one takes the former approach it becomes clear that the ancient mosques in Ra's al Khaymah are not quite so sumptuous. If, on the other hand, we take account of their different geographical locations, comparing those found in the mountains and those on the plains or in the coastal regions, the reasons for a simple style could be quite different. The tribes occupying the mountains were not constantly in contact with those working the land around the palm groves or making their living conducting business or trade in the few urban centres. Consequently economic, social and geographical factors would be equally important reasons for architectural sobriety. All these factors are interwoven in such a way as to make it impossible to discern the one that predominates.



THE FORTS AND TOWERS OF AL 'AYN

Hasan Muḥammad Al Naboodah

The city of al 'Ayn, an oasis located in the south-east of the United Arab Emirates near al Buraymī, is well known for its historic forts. The surviving forts were built by members of the ruling Al Nahyan family in the nineteenth and early twentieth centuries. Other forts and towers were built by members of al Zawāhir and al Na'im tribes, of which none now remain.

The forts were built for a number of purposes, the most important of which was to protect the tribes and their allies and territories. However, in times of peace, the forts were used for administrative purposes, as well as for housing the Ruler. Long before the discovery of oil in the region, these forts were the only buildings to be found near the coastal area and in inland oases. In al 'Ayn, however, every important family had its own fort, where people used to gather every day to discuss their day-to-day socio-political life.

It is believed that people of the region were familiar with fort construction long before the arrival of the Portuguese in Oman. Archaeological evidence from more than one site indicates that pre-Islamic inhabitants of the UAE used similar methods and materials in their buildings. Further, the forts of al 'Ayn are different from other Portuguese forts found in the Gulf, particularly in Oman.

The UAE forts are smaller than their Omani counterparts, and are mainly built from local materials:

stones, local gypsum (*juss*) and clay (*tīm*). These materials can withstand greater temperatures and are more durable than cement and concrete. Al 'Ayn forts were built on sites where water supplies were plentiful, while towers were mainly constructed on hills, for defensive reasons. Inside the fort, one or more wells or a *falaj* (a system for channelling water) would be constructed.

Most of al 'Ayn's forts were square in shape, with external walls approximately 4.6 metres high and one or more towers situated at the corner of each wall. A small mosque would sometimes be located near the tower. The fort would generally have two storeys, the lower generally larger than the upper. The ceilings would be constructed from mats made of date palm fronds and tree stumps. Date palms provided a cheap, readily available building material that was climatically effective in reducing the heat inside the fort.

The main gate, located on the front wall, would be made from timber imported from India or East Africa. Generally the forts were constructed from inexpensive materials and were simply designed, with no arches, columns or embellishment.

Al 'Ayn is the only region in the UAE where two types of forts can be found, those of the ruling family of Al Nahyan and those of local tribes. In order to distinguish between the two, local people used to call the Ruler's fort a palace (*ḥuṣṇ*).

Before the discovery of oil, these forts were the only stone buildings in the al ‘Ayn area, while the houses of the local people were of the *‘arīsh* mats woven of date leaf stalks. The Ruler’s fort had to play a considerable rôle in the socio-political life of the region. Due to its stature and grandness it was considered the centre of the old town, while its courtyard was the main public square for holding the A‘yād and wedding festivities, the beginning and ending of Ramaḍān, the start of the Hijrah year, the appointing of a new Ruler – all would be officially announced from the fort. The square grounds were also used for the *sūq* location particularly during the hunting season; the fort would also be used as a prison for those breaking the customary law (*‘urf*). Public executions of criminals would take place inside the fort. There were, however, very few executions since criminals would seek refuge with their own tribe. In such cases, the victim’s tribe would pay *diyyah* or blood money through the Ruler to have the criminal spared.

The al ‘Ayn region belongs to the Ruler of Abu Dhabi who appoints a representative (*mumaththil*) who is not necessarily a member of the ruling family. The Ruler’s Fort in al ‘Ayn has therefore always been of less political importance than other coastal forts in the UAE. During the reign of Zayed Bin Khalifah (1856–1909) and his successors, the Rulers of al ‘Ayn were members of al Ṣāhibī tribe, the largest tribe in the area. The most renowned Ruler from this tribe was Aḥmad bin Hilāl al Ṣāhibī.

The towers of al ‘Ayn were generally situated close to the main fort, taking up the corners of the defensive walls to act as lookouts, and from which to oversee the water wells and date groves. These towers were manned by watchmen or the fort’s guards.

During his visit to Buraymī in 1840, Captain Atkins Hamerton mentioned some of the important forts of the region:

the fort of al Buraymī (believed to be al-Sidayri fort) is on the south side of the town in an open plain. It is nearly square, surrounded by a dry ditch about 24 feet wide, inside of which there is a wall about 8 feet high, 3 feet thick at the bottom

and not thicker than a foot or fifteen inches on the top: it is constructed, as is the whole fort, of sun-dried brick, and intended to protect matchlock men defending the ditch – between this wall and the fort there is an open space of about 30 feet with mangers for feeding camels or horses. The fort wall is about 14 feet high, 5 thick, with round towers at the angles, ill constructed, they do not flank the curtains ...¹

Until the discovery of oil, the political situation in the area of al Buraymī and al ‘Ayn was frequently unsettled. Inter-tribe raids and disturbances were very common and indeed the Buraymī dispute, documented in letters by Aḥmad bin Hilāl al Ṣāhibī,² has only recently been resolved.³ Tribe loyalty was divided between Oman, Abu Dhabi and Saudi Arabia.

Al ‘Ayn consists of a number of districts, the most important of which are al Hilālī, al Jāhily, Hafit, al Muwayji‘ī, al Mas‘ūdī, Jimī and al Kuwaytāt. These districts were mainly inhabited by groups of the Banī Yās federation, the most important being al Ṣawāhir, al Mazārī, al Sūdān, al Mahayr, al ‘Awāmīr, al Manāṣīr, Āl bū Falāḥ and Banū Ka‘b, all of whom pledged allegiance to Al Nahyan. The Banū Yās federation took over the area of al ‘Ayn, following the political vacuum created by the collapse of the Ya‘āribah rule in the mid-eighteenth century. The federation’s history goes back however to the early seventeenth century when the Banū Yās fought against Nāṣir bin Murshid, the founder of the Ya‘āribah dynasty.⁴ The expansion of the federation took place in the second half of the eighteenth century, under the leadership of Al Nahyan, a branch of the Āl bū Falāḥ tribe. With the reign of Zāyid bin Khalīfah, the territorial control of the Banū Yās federation in south-east Arabia was extended from Khawr al ‘Adid in the Qatar Peninsula to al Buraymī. P. L. Cox, who visited the area in 1902, stated that the Ruler of Abu Dhabi’s practical influence extended beyond Buraymī to ‘Ibri.⁵ This would have included areas of those tribes loyal to Al Nahyan; however, independent tribes and those loyal to the Sultan of Oman lived in the Buraymī area. The political and tribal structure in the region became much more

complex after the interference of the Sa'ūdi's and the establishment of the new Imamate in central Oman, 1915–56.⁶

Al Na'im for its part constituted one of the largest and most influential tribes in the Musandam Peninsula before the discovery of oil. They inhabited a large area extending from Rā's al Khaymah to al Buraymī, with some members of the tribe living near the towns of 'Ibri in the interior and al Rustāq of Oman. Their loyalty was therefore divided between the Qawāsim, Al Nahyan and Oman. Those of al Buraymī were semi-independent, and closer to the Omanis, and some of their forts still exist in the Omani part of the oasis.

Very little is known about the early history of the al Zawāhir tribe which constituted the largest tribe in the area in al 'Ayn, except that the tribe took its name from

the region of al Zāhrah in Oman. Despite the key rôle this tribe played in the Banū Yās federation, particularly in their allegiance to the Al Nahyan over the Buraymī dispute, most of their forts have vanished or been destroyed.

The only forts remaining that can be studied are those of the Al Nahyan family: al Murayjib, al Murabba'ah, Sultan Bin Zayed, al Rumaylah, Jāhily and al Muwayji'i. All these forts were restored in the 1970s by the Department of Tourism and Archaeology in al 'Ayn. Traditional materials were used – mud bricks, palm fronds, logs and local gypsum – but by employing modern construction methods, and various additions and alterations to the original structure, the Department has changed the face of many of the old forts.

The forts

Qal'at Mazyad

A rectangular building with a massive *sūr* and two gateways. The fort has three circular towers which occupy three of the corners, with the fourth corner occupied by a square tower. The fort is on two floors with a large square.

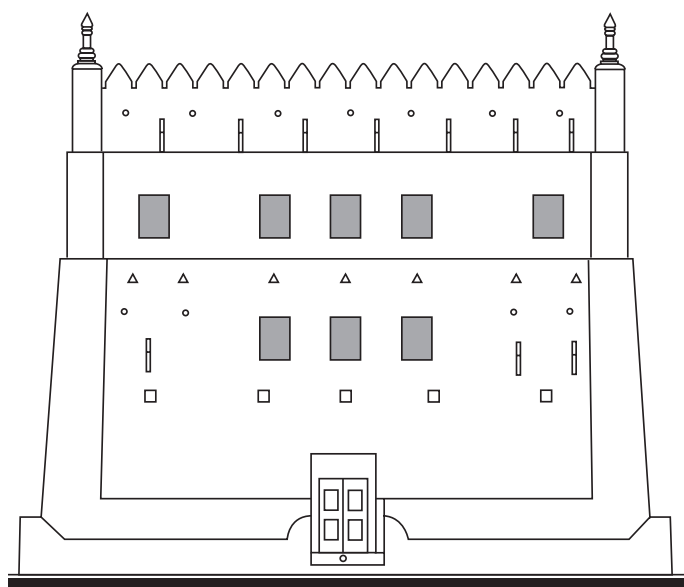
Burj al Murabba'ah

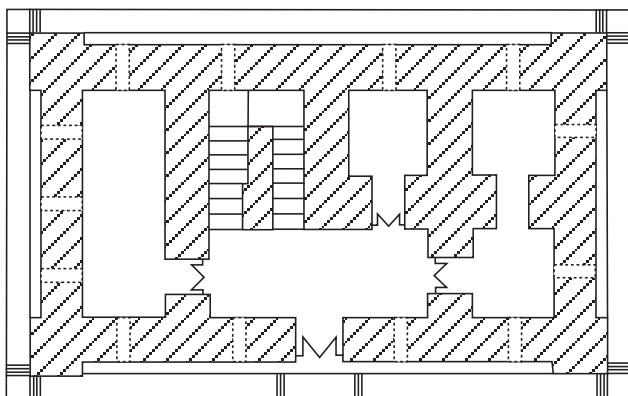
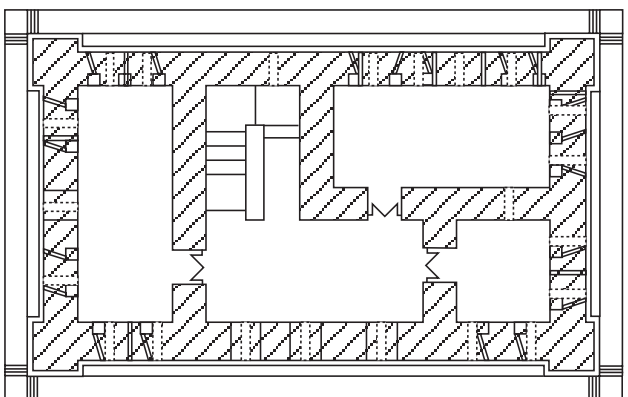
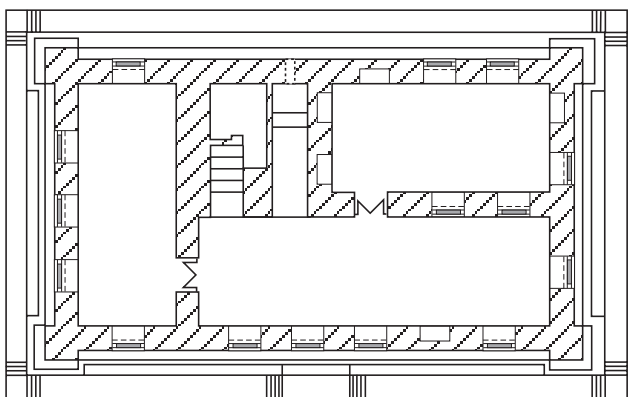
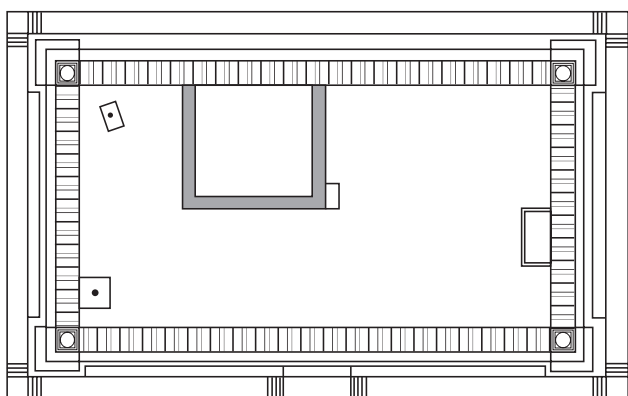
The building of this tower was ordered by Shaykh Zayed Bin Sultan Al Nahyan in 1948, when he was Ruler of the Eastern Region. Although called al Murabba'ah (square) it is rectangular in form (16.1 x 10 metres), and it is built with a ground floor with two upper storeys. The tower has one main entrance, facing south, leading to the internal hall of the *burj* and the main staircase. There are four rooms on the ground floor, the largest being the west-facing room, and three smaller square ones, one adjacent to the staircase and two running across the eastern wall, used for storing arms and ammunition. On the first floor there are four rooms that were used for living and surveillance. All the rooms have openings in all directions. The third floor's three large rooms were set aside for living. The tower is traditionally constructed out of mud brick with ceilings made of palm frond mats. An enclosing wall, *sūr*, surrounds the tower's large grounds (104 x 74 metres) with an entrance gateway to the west.



Top right
Murabba'ah Fort: main building,
looking towards the south-facing
façade containing the main
entrance

Right
Front elevation of the south-side





Above
Murabba'ah Fort: ground floor, first floor, second floor and roof plans



Top
The street entrance

Above
Detail of the multifoil arch at the street entrance, showing the traditional vestibule ceiling construction of date palm trunks and woven palm-frond matting

Qal'at al Murayjib

Named after the locality, it is considered to be one of the oldest Al Nahyan forts in al 'Ayn, constructed around 1816 during the reign of Shaykh Shakhbūt bin Dhiyāb. The fort is on two floors, with six rooms for daily use and living on the ground floor and three entrances to the south and south-east. The first floor has one room only situated in the western corner flanked by two terraces extending east and south. A third level accommodates a roof terrace above the second-floor western room. The fort has two towers that stand separate from the structure. An adjacent tower, 26 metres to the east, is circular with three floors and was used as a watch tower. The second tower, situated at a distance of 130 metres to the west of the fort, is rectangular (8.4 x 7.4 metres). Constructed on three floors it contains a number of rooms that were used by the guards and domestics.

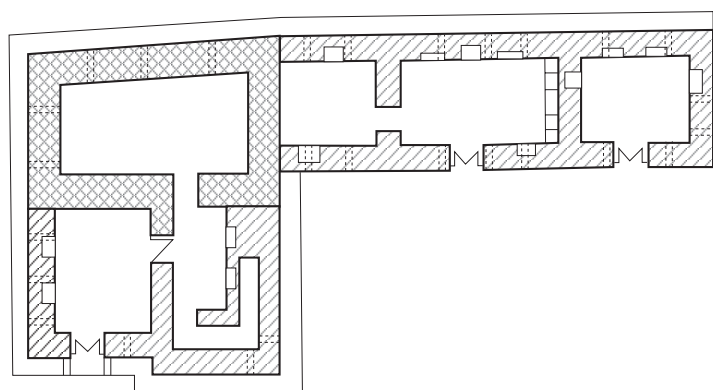
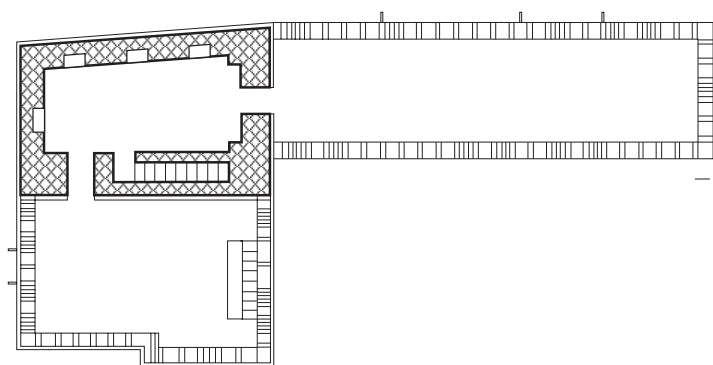
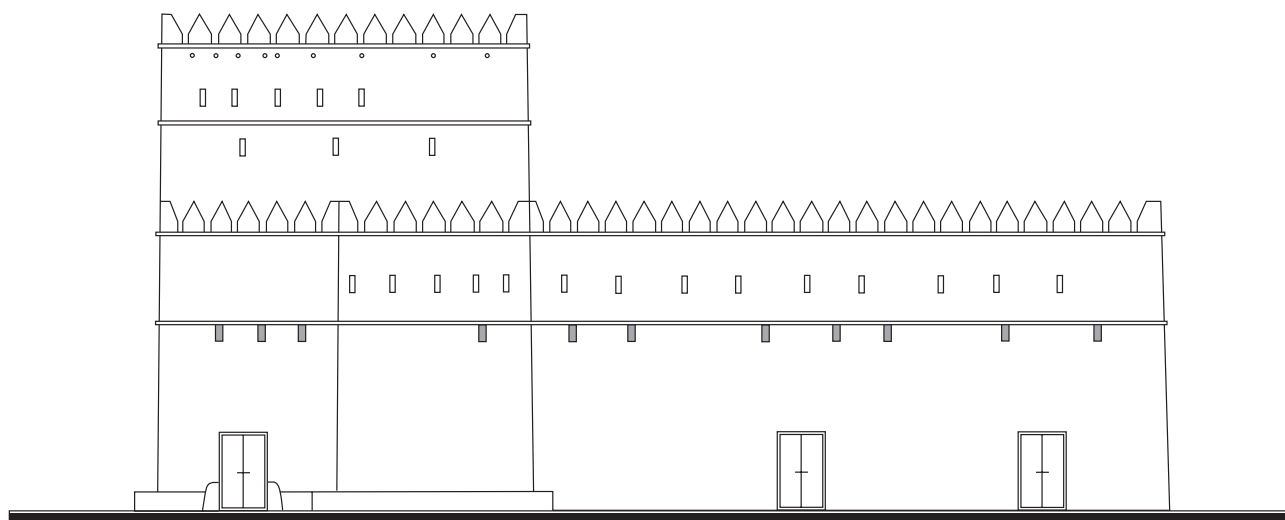
Below

Al Murayjib Fort: rear north-west wall, surrounded by gardens

Right

The square tower





Top
Al Murayjib Fort: front elevation

Middle
First-floor plan

Above
Ground-floor plan



Right
The circular tower

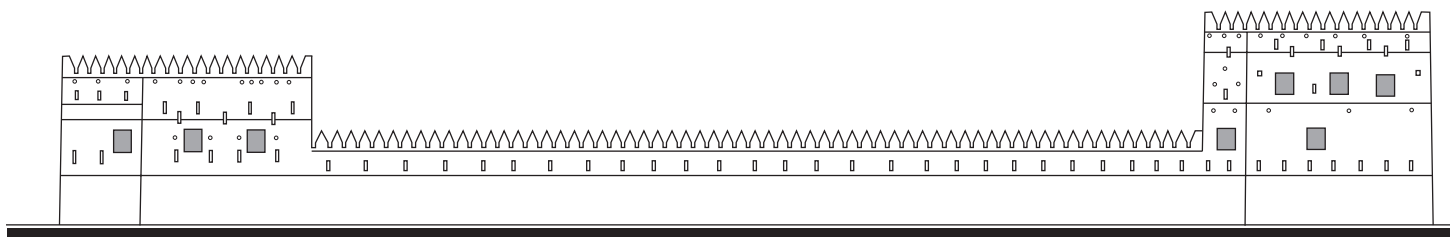
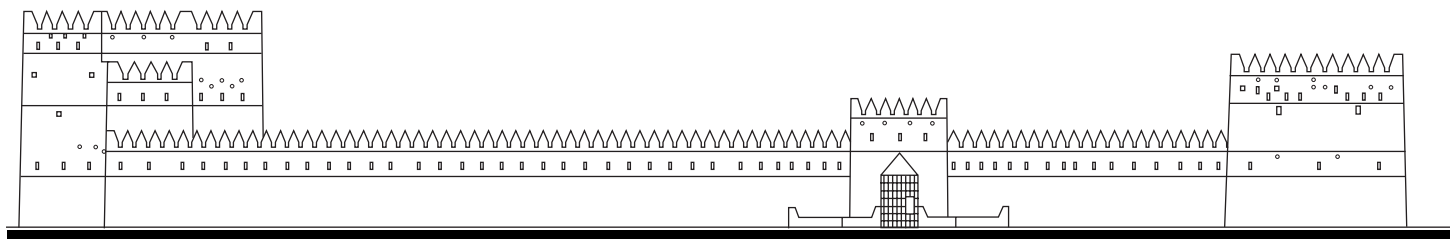
Qal'at al Muwayjiṭ

Al Muwayjiṭ is one of the largest and lushest areas of al 'Ayn, famous for its palm orchards, fertile land and pure breeze. The favourable location was selected by Shaykh Zayed Bin Sultan for constructing his residence and the fort in 1946, and it is where the Crown Prince Shaykh Khalifah Bin Zayed was born.

The fort is a walled compound of approximately 60 x 60 metres with two protruding blocks on the south-east and north-west corners. The north-east corner is contained within the fort *sūr*. The surrounding *sūr*

risers to 5 metres in height with the main entrance gate in the southern façade.

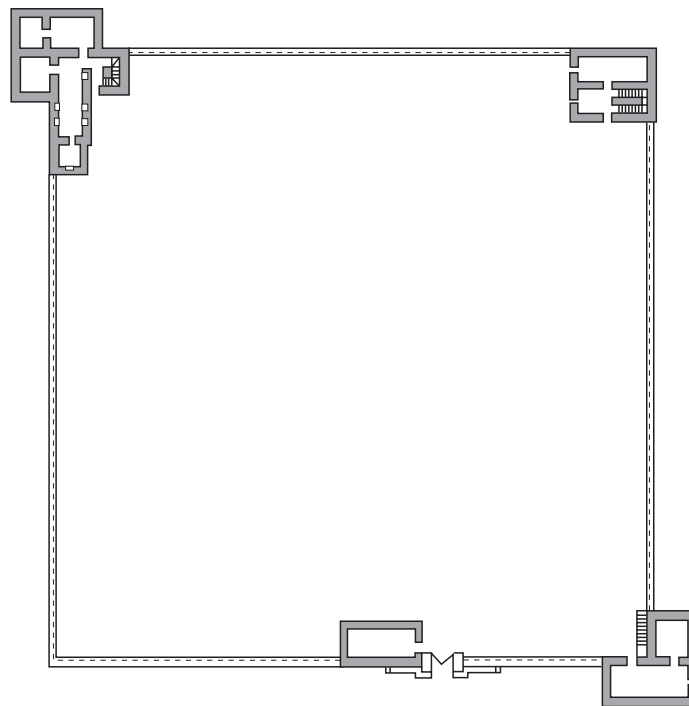
The main building was used for living, and situated on the north-west corner of the compound. It had a total of eight rooms, some for storage, and an open roof terrace on the third floor. The block on the north-east was for the use of the domestic staff and has two floors. The third block, east of the entrance, was used by the guards and as an ammunition store. To the south of this block a mosque was constructed for the fort.



Top
*Qal'at al Muwayjiṭ: front (south)
elevation*

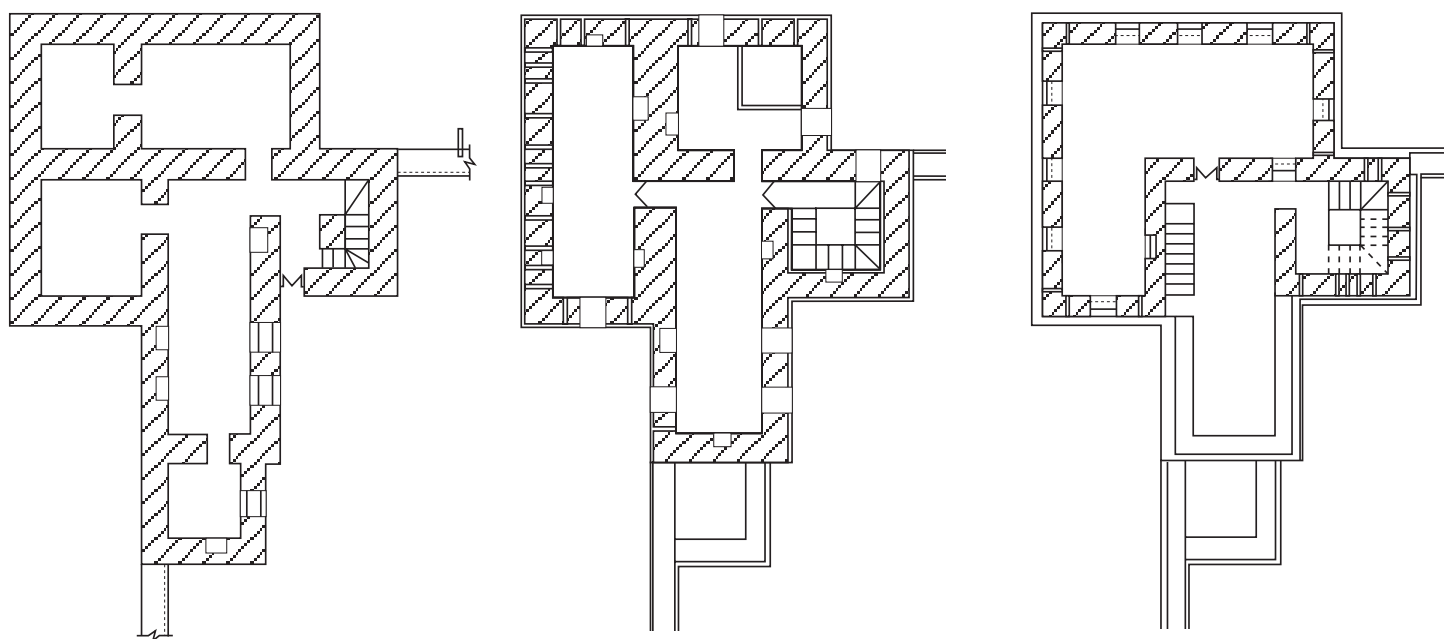
Above
Rear (north) elevation

Right
General plan (ground floor)

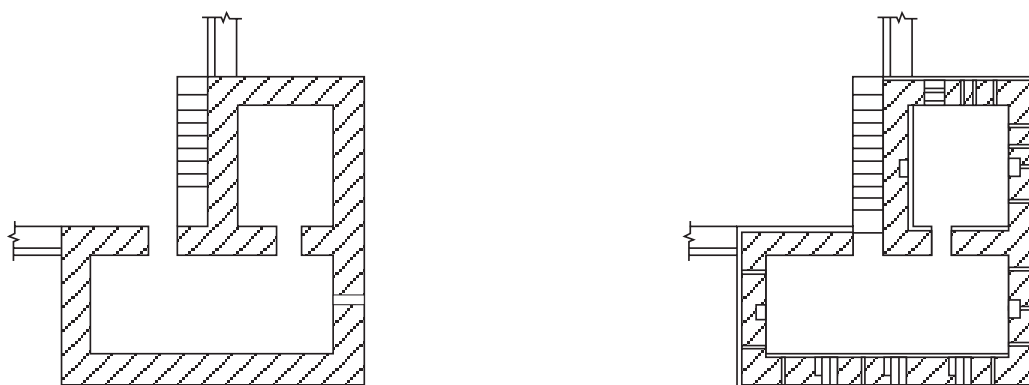




Above
Al Muwayji'i Fort: ground- and first-floor plans of Block No. 2



Above
Ground-, first- and second-floor plans of Block No. 3



Above
Ground- and first-floor plans of Block No. 1

Ḥuṣn al Shaykh Sulṭān

Also known as the Eastern Ḥuṣn, al Ḥuṣn al Sharqī, it is located in the centre of al ‘Ayn and was built by Shaykh Sultan Bin Zayed Al Nahyan around 1910. The *ḥuṣn* has three towers attached to the surrounding wall, on the east, west and south-east corners. The dimensions of this nearly square fort are 41.45 metres on the main south façade of the building and 40.7 metres on the north elevation. The western wall, up to the tower, runs to 31.8 metres. A series of three reception *majlis*-type rooms run parallel to the southern wall and open on to the main entrance gate. Another set runs along the eastern wall of the fort, and were probably allocated for private use. A large square takes up the complete enclosed space on the interior of the enclosing walls.

Above the portal to the *ḥuṣn* run two verses of poetry that celebrate the building and its modest glory:

*Lāḥa najm al sa‘d fī bāb al ‘ulā
majdubū bāqin raghma al mu‘ānid
Ashraq al tārikbu bil yawm al sa‘id
shād bayt al mulk Sulṭān bin Zāyid*

‘The star of joy has emerged on the exalted gateway
its glory will remain despite the resistance
of the opposed

History has brought the shining of a happy
day with the house of rule/dominion constructed
by Sulṭān bin Zāyid’

Since 1971 the renovated fort has been attached to al ‘Ayn Museum.



Above
Sultan Bin Zayed Fort: the south-facing wall with the main entrance

Left
Main entrance

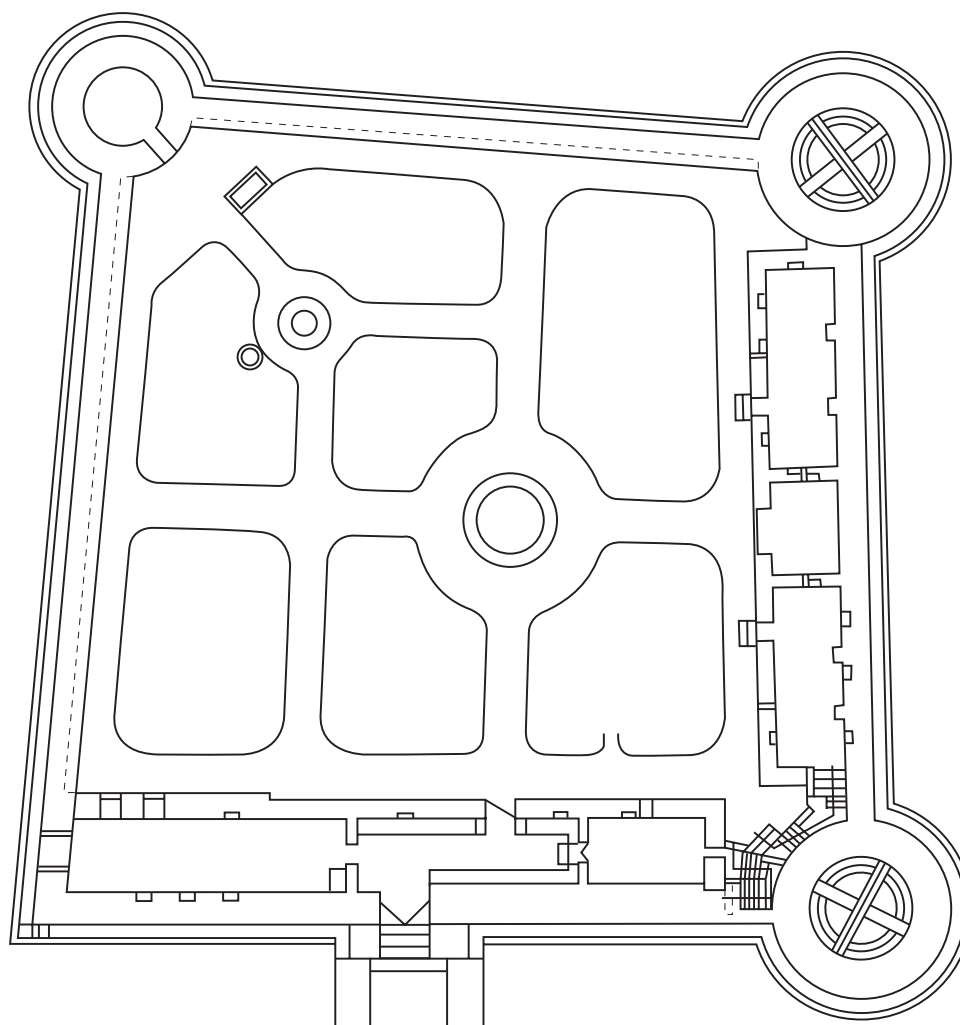


Above

Sultan Bin Zayed Fort: view of the rear north-facing elevation and towers, currently used as al 'Ayn Museum

Below

General ground-floor plan



Qal‘at al Jāhily

One of the largest forts in the country, Qal‘at al Jāhily was constructed by Shaykh Zayed Bin Khalifah in 1898. Shaykh Zayed Bin Sultan Al Nahyan was born there, and used this fort as the centre for administering the affairs of the eastern region while he ruled al ‘Ayn.

The fort takes a square form (35 x 37 metres) placed at the north-east corner of the walled enclosure, with three circular towers rising to 9 metres in height, two attached to the surrounding wall on the north-west and south-east, and one placed at the south-west corner inside the compound. The remaining corner on the north-east had the Shaykh’s *majlis*, from where he conducted official affairs. The fort’s surrounding *sūr* is 122 metres long at the north wall, and 88 metres long on the eastern wall built, with a stone foundation and mud-brick walls.

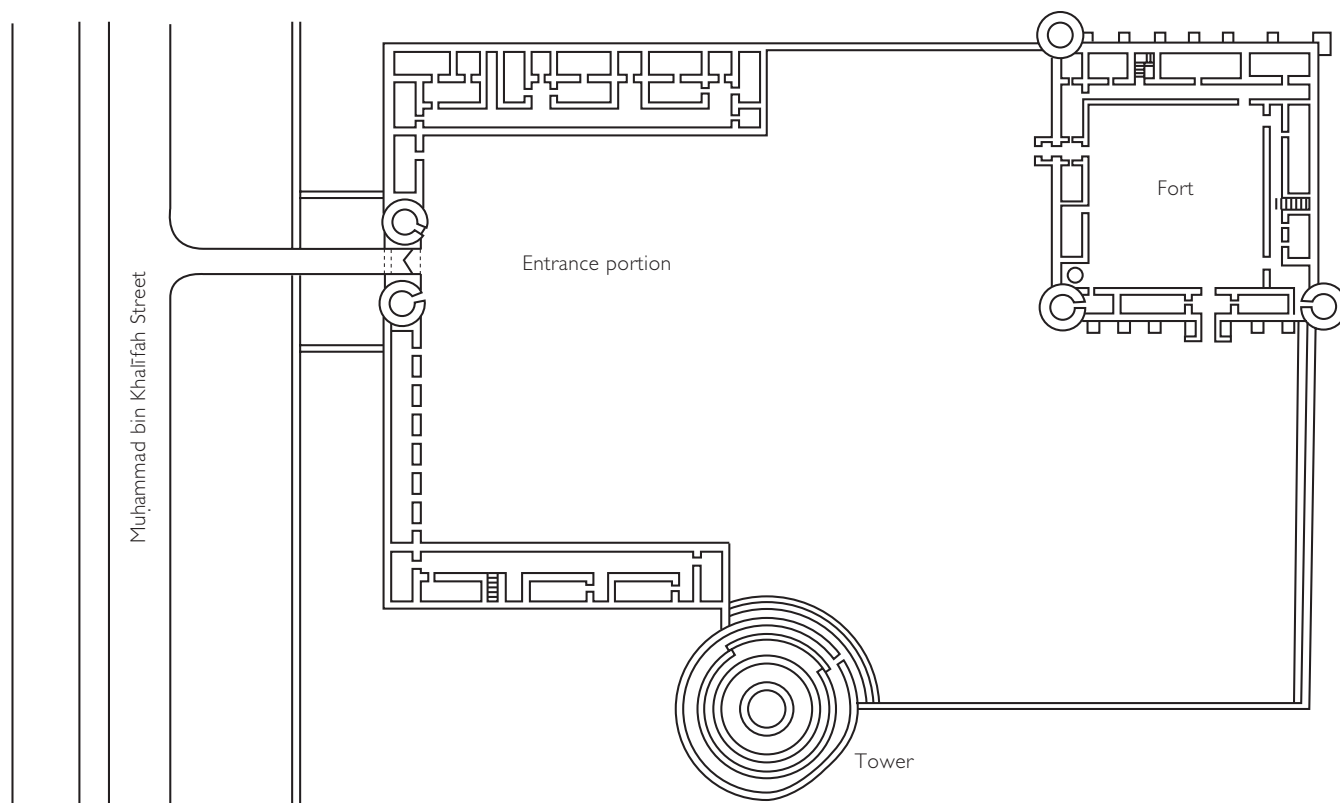
The fort has two large gateways; the southern one (on the interior fort) has two verses of poetry inscribed on the entrance, associating the opening of the gate with good will and deeds, where happiness resides

in exaltation and glory celebrates, documenting the construction of a house by Zayed Bin Khalifah:

fataḥa bāb al khayr fī bāb al ‘ulā
ḥalla fībi al sa‘d bil ‘ulyā’ al munīfah
tabānī al ‘izz qālat arkbū
dār jad shādabu Zāyid bin Khalīfah

The second gateway is located on the western side of the fort. It is inscribed ‘In the name of Allah the Merciful the Compassionate, Allah is with those who are patient.’ Flanked by two towers, this entrance is quite elaborate on the interior and attached to a series of rooms and arcades running to the north and south forming an open block that extends to the east, towards the *ḥuṣn* and the fort.

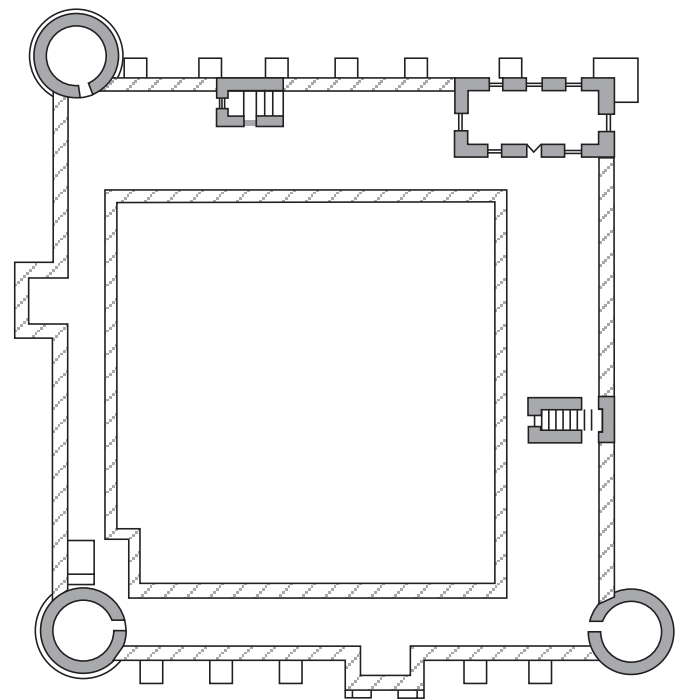
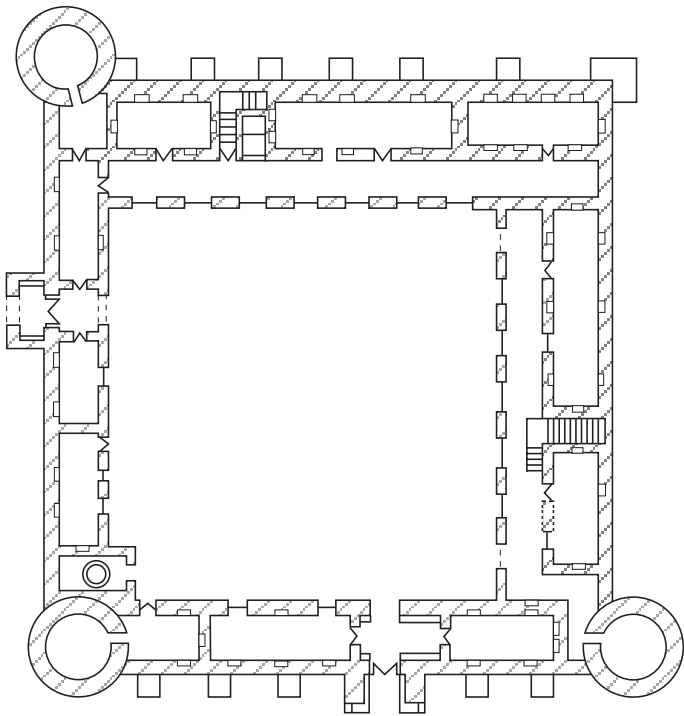
The interior fort has thirteen rooms, lining the four walls, with two arcades running on the eastern and northern side, preceding the rooms and opening onto the courtyard. Those on the interior south and west walls open directly onto the central courtyard space.



Above
 General plan (1990–95)

The circular *ḥuṣn* of the fort is located to its south-west. Concentric in plan, with a central tower, it contains a number of rooms on the first floor that were used by the soldiers and for keeping arms and ammunition. Like the rest of the forts, this impressive and extraordinary structure was constructed in sun-dried mud brick.

Attached to the fort is a mosque located to the south-west of the *ḥuṣn* structure. Like the *ḥuṣn*, the structure of the mosque has been subject to modification during the course of renovation.



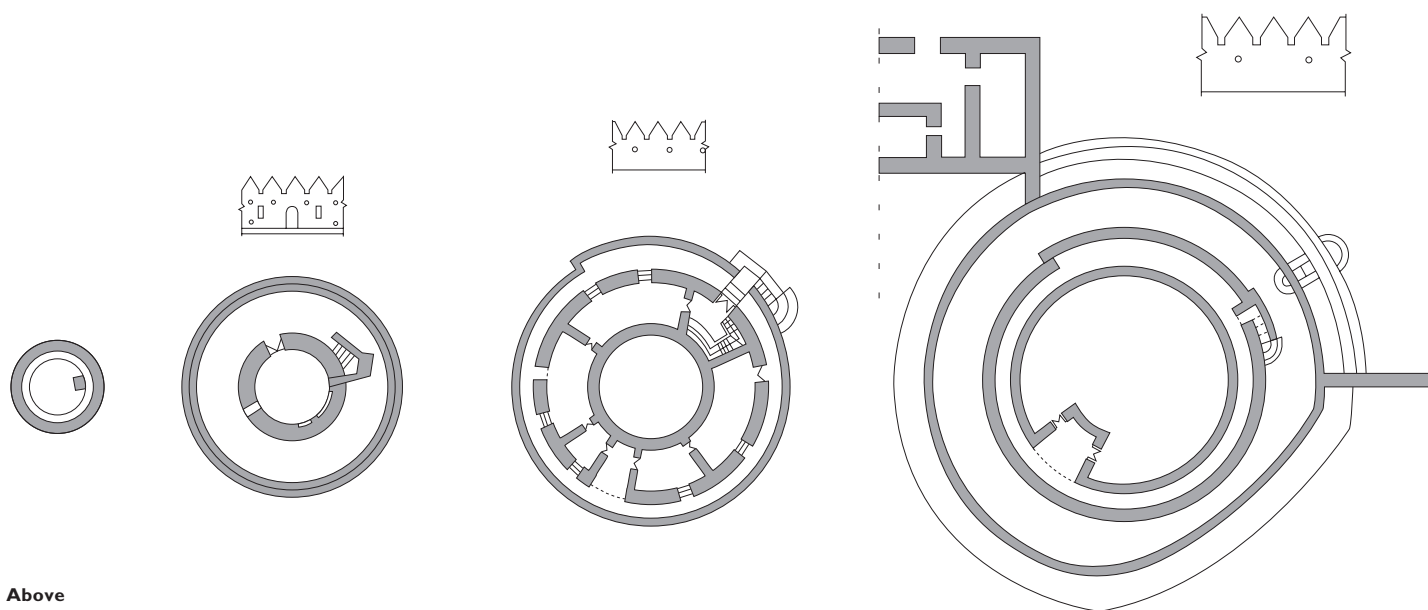
Above and right

Al Jāhily Fort: ground- and first-floor plans

Below

The series of rooms used by the Shaykhs constructed around the courtyard





Above

Al Jāhily Fort: top-, second-, first- and ground-floor plans



Top

Close-up of the tower. It was built by HH Shaykh Zayed Bin Sultan Bin Khalifah (Zayed I) in 1898. Madar sun-baked bricks were used for the construction of the thick defensive walls with palm fronds and woven mats used for the ceilings

Above

Detail of a multifoil arch at the entrance to the Fort



Above

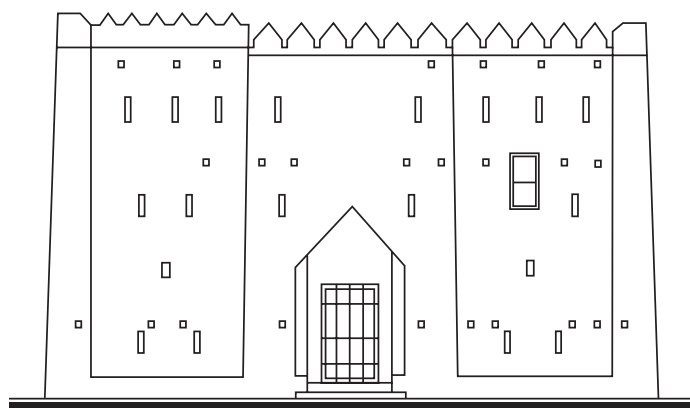
South-facing entrance to the buildings within the Fort. The inscription above the portal wishes welfare and happiness on the Fort and on Zayed for establishing this glorious building

Burj al Rumaylah

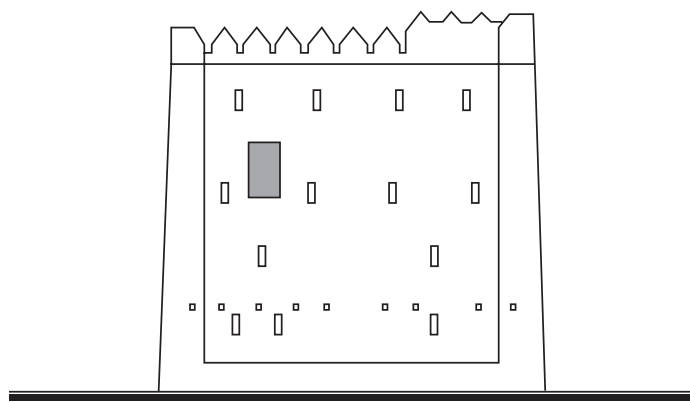
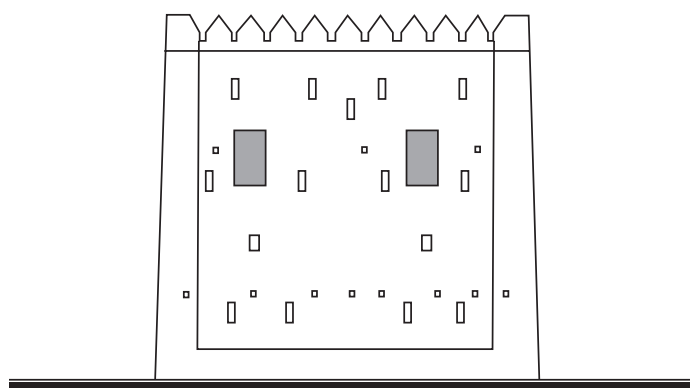
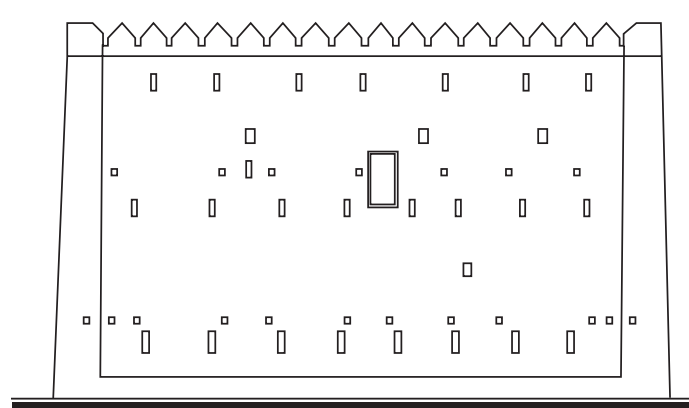
One of the smaller towers, measuring 13.3 x 8.4 metres, it is simple in its rectangular plan, set within an interesting nine-sided polygonal surrounding *sūr*. The main entrance gateway through this *sūr* is on the eastern side, corresponding to the main façade and entrance of the tower. The exterior walls of the

three-storey tower taper in the traditional form with narrow slit openings. Windows only occur on the first floor, one in each façade except for two on the northern façade.

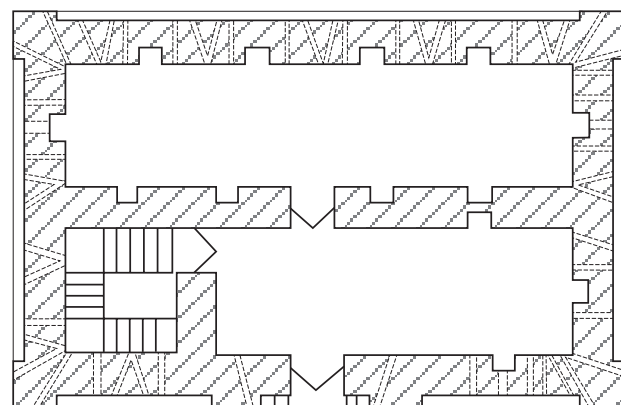
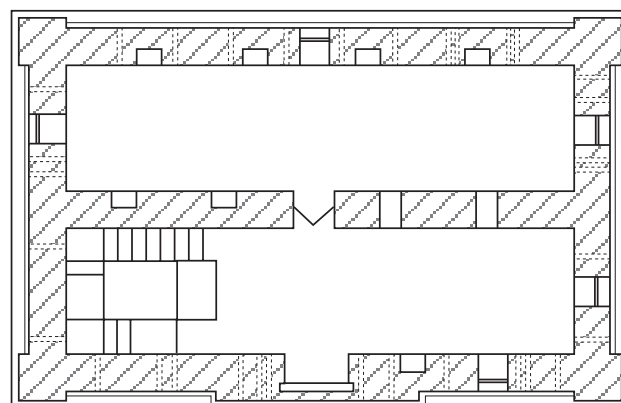
Each of the two floors is divided into two rooms by a central wall running north–south, with a roof terrace on the third floor.



Above and right
Front and rear elevations



Above
Northern and southern elevations



Above
First- and ground-floor plans



ANALYSIS OF THE SQUARE: AL MURABBA‘AH

Abdul Sattar Al-Azzawi

The linguistic and architectural meaning

The Arabic word *murabba‘ah* has several different meanings, denoting various architectural features. The Persian philologist and lexicographer Al Fairūz Ābādī (d. 1415), in his dictionary *Al Qāmūs Al-Muḥīṭ*, and Arab philologist Ibn Manẓūr (d. 1311), in his dictionary *Lisān Al-Arab*, attribute various meanings to the word *murabba‘ah*. They both cite it as meaning a *majlis*, i.e. a space designated for sitting; a place to sit or a seat; a part of a town – a constructed district or a quarter; or a reception hall which is essentially square in shape.

Lexicographer Louis Ma‘alouf (d. 1946) in his dictionary *Al-Munjid* cites the verb form of the word: *rabba‘a*, meaning to build a house around a square, or the centre space or well, and another derivative verb *tarabba‘a*, meaning to sit cross-legged on the floor with the feet under the thighs.

According to Al Fairūz Ābādī, the word *murabba‘ah* derives from *raba‘*, i.e. an abode, a district or a house; and from *tarbī‘*, i.e. a place for dwelling or sitting in the springtime such as an arbour, or a seat. Ghālēb, in his *Encyclopedia of Architecture*, notes that the design and construction of the *murabba‘ah* should serve the purpose of a *majlis*, a reception hall or a *takīyyah*. The Arabic

word *iwān* (or *līwān*) could also be used in a similar sense as *majlis*, and for a place for holding meetings and other purposes.

The term *murabba‘ah* was cited by historians and geographers of old, when they narrated historical episodes and described locations of towns or districts involving renowned personages or occurrences. The most famous of the *murabba‘at*, according to Arab historian Al Tabarī (d. 923), in his *Chronicle of Nations and Kings* (*Tārikh al-‘Umam wa al Mulūk*), was Abī Al Abbās Al Fadl Bin Sulaiman Al Ṭūsy’s *murabba‘ah*. In this chronicle we come across the following: ‘The village in Murabba‘at Abī Al Abbās ... was named al Wardaniyah, and the other village, which still stands today, was named after Murabba‘at Abī Farwah ...’. ‘... It was reported that he saw [‘Abbāsīd Caliph] Al-Mu‘taṣim riding away from the mosque [in Baghdad] ... and when he reached Murabba‘at Al Ḥursh ...’; ‘... Abū Al-Abbās Muḥammad Bin Al-Muqtadr rode away from the palace ... he was intercepted by a man at Murabba‘at Al Ḥursh ...’; ‘... and they feared a throng of troops would come out to fight from the *murabba‘ah* ...’; and ‘... the master of the *zunj* (negroes) ... his followers dispersed ... until they reached Murabba‘at Dubbā ...’.

Historian and geographer Yāqūt Al Ḥamawī (d. 1229), in his geographic lexicon *Muʿjam Al-Buldān*, mentions several *murabbaʿāt* – Dubbā, Al Khurasī, Abī Al Abbas and Al-Furs. He further describes the location of Murabaʿat Dubbā as within the area of Baṣrah, which boasts villages and canals, the greatest of which feeds from the Tigris and was dug during the reign of ʿAbbāsīd Caliph Al Rashīd.

Moreover, historian and geographer Al Yaʿqūbī of Baghdad (d. after 905) mentions the *murabbaʿah* in describing the construction of al Jaʿfariyyah, the town built by ʿAbbāsīd Caliph Al Mutawakil: ‘... the *sūqs* were erected in a separate location, and in each *murabbaʿah* and district, a marketplace was established, and the mosque was built in the year 247’.

We can deduce from the above that the *murabbaʿah*, according to historical evidence is, in design and construction, an architectural unit, whether separate from or incorporated into other structures. It is a term which designates a residential architectural unit.

A *murabbaʿah* was usually given a famous name to be known by. It could be named after the builder or the area in which it stood; it could also be given the name of a political event or even an element of nature. Dr Ṣāliḥ Aḥmad Al ʿAlī in his *khuṭaṭ al Baṣrah (Plans of Baṣrah)* quotes from critic Ibn Salam Al-Jumahi of Baṣrah (d. 846), who speaks of Murabbaʿat Banī Manqar of the Tamīm tribe and also of Murabbaʿat Banī Kilab of the Qaḥṭānī tribe which, he notes, people peculiarly called Murabbaʿat *kilāb*, the plural of *kalb*, the Arabic word for dog.

ʿAbbāsīd writer Al Jāḥiz (d. 868), in his *Book of Animals* (Kitab Al-Ḥaywān), refers to the *murabbaʿah* (‘the sellers of Murabaʿat Manqar’), as does historian Al-Balādhiri (d. 892) in his *Conquests* (Futūḥ) when he speaks of Murabbaʿat Bāb Uthman on the way to Marbad, named after Uthman Bin Abī Al ʿĀs, a companion of the Prophet. The famed Andalusian traveller Ibn Jubayr (d. 1217) in his *Journey*, upon arriving in Baghdad, wrote: ‘we stayed in a suburb known by the name of *Murabbaʿah*, on the Tigris, near the bridge’.

Here, the term *murabbaʿah* is used to indicate an architectural unit regardless of whether the intended

purpose of the structure was social or defensive. Yet more often than not, the *murabbaʿah* is constructed as an architectural unit of a military nature incorporating elements of defence, and the name is given to such a structure because it is designed as a square. This is despite the fact that the figurative meaning of *murabbaʿah* is taken from the word *julūs*, i.e. sitting (cross-legged) on the floor, and from the words which indicate the place for sitting or resting in springtime, *marbbaʿ* and *maqʿad* – and also from *tarbiʿ*, i.e. to sit cross-legged, rather than kneeling or squatting.

On the other hand, the word *murabbaʿah* is also employed to indicate an area, a stretch of land or a district in a town (a quarter), without necessarily having a *murabbaʿah* (i.e. a square structure) in it, although the pattern of the area may have been planned as a square. We read of this in Al-Ṭabarī: ‘... the village in Murabbaʿat Abī Al ʿAbbās was the village of his maternal grandfather’.

From the above, we know that *murabbaʿah* was employed to indicate both a structure likely to be designed as a square, or an area planned as a square, i.e. a district whose buildings are located in a square area. Here we are concerned with the *murabbaʿah* as an architectural unit not only in terms of its design and elements, but also in terms of its social and military function.

Finally, it should be noted that in certain areas such as in Sharjah, the *murabbaʿah* is called a *ghurfah* (room) instead. This term is actually employed to refer to a number of *murabbaʿat* in Raʾs Al Khaymah, such as the ‘Ghurfat al Qaṣīdāt’, the ‘Ghuraf al ʿUraybī’, the ‘Ghuraf al Baqīshī’, and ‘Ghuraf Abu ʿAblā’, which is a *murabbaʿah* on the island of Al Ḥamrā.

Analysis of the architectural elements of the *murabba'ah*

An analysis of the architectural elements of the *murabba'ah* requires a study of its design and its construction.

Design and form

The Arabic name *al murabba'ah* for this architectural unit is self-indicative – it is a square. But in fact, once the design is actually being executed at the construction site, and the foundations of the walls begin to appear, the difference between the meaning of the name and the actual structure soon becomes apparent.

All *murabba'at*, both those that are incorporated into buildings and those that are separate secluded structures, are rectangular in shape. The dimensions of the opposite sides of the *murabba'ah* are usually equal. Therefore, *murabba'ah* is just a term, not indicative of a shape. The term *murabba'ah* is derived from the word for a familiar social habit in Arab as well as Muslim communities – the habit of sitting cross-legged, i.e. *tarabba'a*. Thus, the name *murabba'ah* was a commonly used term, without it meaning a rectangular shape. Moreover, meetings, social or otherwise, did not have to be held in a place which is square in form; rather, it is well known that the *murabba'ah*, in location and size, is ordinarily a comfortable place to meet or to sit in every day. It served as a club and a meeting place for the inhabitants of the area at a time when clubs and coffee shops were still unknown. The *murabba'ah* compensated for this feature of social life.

The plans designated foundations for a rectangular structure whether the *murabba'ah* was a separate secluded structure or incorporated into another building. Its location as part of structures such as palaces and castles is of no significance. Whether it was in the corner or the centre of a building did not change the fact that its dimensions clearly indicated that it would be rectangular rather than square, as its name suggests.

When designing a *murabba'ah*, the initial step was to determine its location – whether it was to be the separate secluded type or a structure incorporated into a larger plan for a *qasr* or a *ḥuṣn*. This was followed by determining the measurements of the foundations – the dimensions, length and breadth and the depth and thickness. This would be followed by the steps necessary for preparing the site for construction.

The depth of the foundations depended on the quality and composition of the soil, which determined the depth possible for the foundations to evenly distribute the load of the walls, ceilings and roofs. The width and the thickness of the walls should be proportional to the determined height of the *murabba'ah*, and the degree of inclination or slope of the wall elevations. The *murabba'ah* is often characterized by the inclination of its four walls. This is in conformity with an architectural principle: it reinforces the strength of the walls. This slight inclination can be noted in the external wall elevations and in the front elevation extending from the ground up to the edges of the crenellated battlements with its windows, and the entrance opening with its loopholes and embrasures.

The wall elevations within were perpendicular to the ground floor, with niches or square openings. The opening of the entrance traversed one of the sides of the *murabba'ah* on the ground floor. There might also have been windows overlooking the inner grounds or courtyard, especially in the *murabba'at* that were part of a larger structure.

The interior wall elevations of the *murabba'ah*'s first storey showed the opening of the entrance and had a window overlooking the outer grounds, in addition to embrasures and the openings of the vertical loopholes. The front elevation was vertical and a wooden staircase may be found in one of its corners.

The width of the foundations and walls was proportional to the height of the *murabba'ah*. The

murabba'ah of Al Shāmsī in Sharjah clearly shows the difference in width between the base and the top of the wall as a result of the inclination: at the base the width is 60 centimetres, but at the top it is 30 centimetres, a difference of 30 centimetres in the descending line of the exterior wall elevation.

The inclination could be seen from the front, rear and side elevations of the *murabba'ah*, whether it was a separate secluded structure or incorporated into a building – especially when it was built within the lofty *ḥuṣūn*. It can also be seen in the foundations of the *murabba'ah* in the *ḥuṣūn* of Dībba and Kalbā', planned on an elevated platform or *maṣṭabah* with slanting walls. Each *murabba'ah* is located in the middle of the structure, with a characteristic slope of wall elevations on the ground floor and the first storey, which helped to reinforce the building and facilitated both defence and surveillance and provided the defenders with a commanding position against attackers.

During construction, the front elevation of the *murabba'ah* could be decorated with certain patterns – for example perpendicular steppings starting from the base or just above it, which could be vertical straight lines or squares or rectangles. The use of vertical steppings served to reinforce it. The steppings bind and fasten the construction materials of the walls and add an aesthetic element to the *murabba'ah*. The gradation with the varying degree of depth gives the elevations the appearance of an artistic mural, and the *murabba'ah* an attractive articulation. This element contributes to the wall elevations of a defence-oriented structure as a means for artistic expression.

These steppings in the front elevation could also save the use of primary materials, especially since the walls are usually thick and wide at the base. Their use may lead the builder to have ribbed the front elevation and line the base to project part of it, or work on the corners to complement the square towers incorporated into the front elevation.

Horizontal gradations or steppings sometimes characterize the different storeys of *murabba'at*. These appear in the form of lines or gradations around the elevations of the *murabba'ah*, whose ground floor is wider

in area than the uppermost part, in accordance with the principle of sloping elevations. This architectural element reduces the steepness of the inclination from one floor to another.

Most front elevations of *murabba'at* however are devoid of vertical and horizontal steppings and the front elevation shows only loopholes, machicolations, windows and doors.

This principle of alignment is the essential element in the construction of the *murabba'ah* as a defence structure. It reinforces the defence capability of the *murabba'ah*: the defenders are better positioned to watch for assailants and determine the position of the enemy. That is why most *murabba'at* are devoid of steppings or gradations.

The size of the *murabba'ah* depends on its type: the size of a separate secluded *murabba'ah* depends on its location, while that of a *murabba'ah* incorporated into a larger structure such as a fort or a *ḥuṣn* is proportional to the elements of the larger structure.

The design of the *murabba'ah* can be seen in the foundations of its walls, the location of the entrance on the ground floor and the first storey, the position and distribution of the niches and the location of the store room (where weapons and other tools are hung). The design determines the degree of inclination of the front, rear and side elevations, the location of the staircase leading to the upper storey and also the location of windows and other openings, such as loopholes and crenellated battlements, in addition to the slope of the roof to allow for rain water drainage through gutters of various sizes made of wood or hollowed tree trunks.

The entrance

The location of the entrance is an essential element in the planning of the *murabba'ah*, whether it is one-storeyed or two-storeyed. The entrances have narrow openings; they are narrower and lower in height than the entrances of adjacent residential or service units.

The location of the entrance is often in the middle of the longer side of the rectangle. This entrance traverses the thickness of the wall, and the door is slightly elevated, about 10–20 centimetres from ground level. This feature

helps prevent the leaking in of rain water and ensures the sturdiness and resistance of the entrance opening, reinforces the foundations and reduces height of the opening.

The locations of the doors of the *murabba'ah* on the ground floor and first storey were vertically aligned. This served a defensive purpose, for it enabled the guards on the first floor to command and defend the entrance on the ground floor. Sometimes, however, there may not be an entrance to the first storey of a *murabba'ah*. In this case the ground-floor entrance would lead to the first storey through an opening in the ceiling, which could be reached by a fixed or moveable ladder. This is similar to the style of tower entrances, where the upper floors are also reached through openings in the ceilings.

The shape of the door was indicative of the defence function of the *murabba'ah*. All its elements and parts suggest one objective: to render the *murabba'ah* strong, sturdy and ultimately defensible. The door was similar in shape and style to the other wooden doors in the residential unit within which the *murabba'ah* was situated, or other nearby buildings. It was made of whatever kind of wood was available, but usually of the solid resistant kind such as teak wood. Sometimes, trunks of palm trees were used. These were nailed to rough, strong and resistant side boards.

More often than not, the doors were padlocked from the inside, to be opened and closed by the guards and the defenders of the *murabba'ah*. Some of the doors would have two sliding bolts in opposite directions on the inside, for more security.

All the materials and parts used to mount the wooden doors needed to be fortified for a structure whose function was defence. Big long nails were used, with their ends hooked around the door jambs on the inside. Little ornamentation adorned the doors of *murabba'at*. They were simple doors, and any carvings would be similar to those adorning the doors of adjacent units or nearby buildings. The doors were often two-leaf doors with strong resistant jambs. The nails used were made of iron or copper and were more numerous on the inside for added security, with pivot hinges. We may find metal door leaves and wood incorporated into the frame at the bottom and the top of the jamb.

The entrances to the *murabba'ah* on the ground floor and the first storey seem to have smaller dimensions compared to entrances of other nearby buildings, and in relation to the size of the *murabba'ah* as a whole. The principle dictating this peculiarity was the need to strengthen the defences of the structure against the assault of enemies since the *murabba'ah* is a defence unit.

The entrance to the *murabba'ah* was sometimes vaulted, but this is a rare feature. Sometimes the entrance could have thick protruding sides along the height of the door, thicker than the walls of the *murabba'ah*. These walls are known to be thick, but here, while the walls might be 30 centimetres thick, the protruding sides would be 50 centimetres thick.

The windows

Windows are essential and distinctive elements in the *murabba'ah*. They allow in daylight and fresh air, in addition to their function as observation and surveillance points. They stretch across the walls of the *murabba'ah* on the first storey and overlook the interior courtyard in the type of structure which is incorporated within residential units, or that is surrounded by a wall connected to one of the sides – where windows on the interior wall elevation are particularly important.

The height of interior windows overlooking a courtyard varies from 30–50 centimetres or more from floor level. This leads us to believe that the ground floor of the *murabba'ah* was used as a storehouse for foodstuffs or weapons. The height of the windows was an added element of defence as it rendered them out of reach, or difficult for attackers to climb through. As for their shape, rectangular windows with wooden frames predominated in the *murabba'ah*'s ground floor. We may also find other openings or windows that are frameless and square, triangular or even circular in shape, and that are mostly found in one-storeyed *murabba'at* built with mud. Their function, in addition to ventilation, was to allow in daylight. They could be closed for whatever purpose, mostly in winter, using mud bricks.

On the ground floor, some windows appear in the upper parts of the walls. Their function was ventilation and allowing in daylight, but sometimes these openings

were circular and served as surveillance points. Circular loopholes were also found in the upper parapet overlooking the grounds, and often in the parapet over the entrances. Serving as surveillance points, these loopholes commanded the area outside the *murabba'ah*, reinforcing the defence of the structure. Examples of such an architectural element can be found in the city of Sharjah – in the upper parapet above the entrance of Bayt Al-Nābūdah (presently the Heritage Museum) and in the parapet of Bayt Al-Sirkāl in the area of Al-Shuwayhin (presently the Arts Museum), and also in the area of Murayjah. Moreover, there are windows in the side walls of the *murabba'ah* on the ground floor, overlooking the outer area in front of the *murabba'ah* and also the inner courtyard, if the structure is an incorporated *murabba'ah*.

Square or rectangular windows appear in the side walls of the first storey. They are of two types.

The rectangular window

There are examples of rectangular windows in the side walls of the *murabba'ah* which have wood frames and are divided in the middle by a wooden transom. These windows were secured by iron grilles and were closed by means of wooden shutters. Wooden-framed windows were mounted at a depth of 10 centimetres from the outer surface of the wall, and, when closed, were usually secured by wooden bolts. The dimensions of the windows varied in length from 1.5–1.8 metres and in width from 80–110 centimetres. They were located at a height of 50 centimetres or more above the floor of the first storey.

Another type of rectangular window is also found in a *murabba'ah*. They seem to have been located with the sole purpose of surveillance while the watcher was sitting on the roof of the first storey. The best known example of this type of window can be found in the *murabba'ah* of 'Alī Bin Rāshid in the village of Al Khān in the Emirate of Sharjah. It is divided into two sections. The lower section is only one-quarter of the whole window, and is latticed woodwork. The upper section is secured by iron bars fitted lengthwise into the wooden frame. It is closed by wooden shutters and secured by a sliding wooden bolt.

The use of the upper part of the rectangular windows as ventilation shafts indicates that when the windows were closed, the *bād gīr*-style air-shafts were used to ventilate the *murabba'ah*. These windows could be opened and closed according to need, circumstances and climatic conditions, and could be used for watching and observation since the thickness of the walls provided enough space to accommodate a seated person.

This type of window was also used in towers.

The square window

The square windows of the *murabba'ah* could be designed in two ways. The first is a wooden-framed window with iron bars, or an iron grille, fitted across the opening. The function of these windows was the same as those described above. They are horizontally positioned in the middle of the walls of the first storey.

The second type of square window is a mere opening in the wall of the *murabba'ah*, but whose sides have an inward inclination so that the outside opening is larger than the inside opening. The purpose of such windows was for defence. They gave the defender a better, wider view of the area outside the *murabba'ah*, and the attacker a narrower opening through which to aim at the defenders inside. Such windows were located 20–30 centimetres above the floor level of the first storey. They were covered and painted with the same liquid material used for the interior walls of the *murabba'ah*. An iron grille was fitted over the front of the window and was fixed to the wooden frame. It usually had geometric or floral designs such as carved leaves, and was used for better security and defence as well as for aesthetic reasons. Objects such as jugs, pitchers or jars were often placed on the ledge of the window, and in certain seasons fruit such as dates were placed there too. But these uses depended on the circumstances prevailing in the area where the *murabba'ah* was located. People, old and young, would gather there on special occasions, especially during feasts and the holy month of Ramadan. Thus, it was the '*marbad*' or social club of the area where adults sat at the front and the children at the back to listen to a storyteller narrating stories or anecdotes and to learn the moral, social and military lessons of such tales.

The location of the windows in the *murabba'ah* is important. It is determined by considering the need to allow in daylight and fresh air and that the occupants must be able to view the grounds, observe what goes on around them and learn the news of the area.

The embrasures

The embrasures are found in the upper parts of the walls. Their size and number is in proportion to the size of the *murabba'ah*, the thickness of its walls and the building materials used. They appear in various shapes: circular, rectangular or square. These small openings are made during the construction of the walls. They were planned in advance and their position was usually 20–30 centimetres below the ceiling. Wooden lintels (or tree trunks) span over these openings to reinforce the structure, particularly when the embrasures were located in the walls that support the wood of the roofs. This method is applied in making all kinds of embrasures.

Circular embrasures are 15–20 centimetres in diameter, while the dimensions of the rectangular kind are 30 x 20 centimetres and those of the square kind 30 x 30 centimetres. These small openings may have a wooden frame with one or two iron bars fitted to it. When the embrasure is circular it may not have a frame so it is merely an opening, sometimes intersected by a wooden or iron bar.

The embrasures in the *murabba'ah* allowed daylight in and ventilated the structure, especially during winter when fires were lit. In addition, iron grilles kept out birds and partly filled up the openings, and could be opened or shut as needed, depending on weather conditions. The embrasures are usually 1.5–2 metres apart, and appear on all storeys of the *murabba'ah* on all four sides.

These embrasures do not affect the architectural features or hinder their functions. Whatever their type, the embrasures were all reinforced at the top with *shandal* wood, tree trunks or solid, resistant wooden boards to fortify the walls. Embrasures also helped maintain room temperature within the *murabba'ah* since their small size does not actually allow them to help in ventilating the interior. However, the height of their

location in the walls helped to expel warm, stale air as cooler currents entered below from under the doors.

At first, it seems that the architectural plan of the *murabba'ah* in Sharjah did not provide for air shafts in the elevations. Yet, we do know of the existence of air shafts in the elevations of other *murabba'at* such as the Al-'Uraybi *murabba'ah*, located in the area of Al-'Uraybi in Ra's al Khaymah, so it is likely that such air shafts will be found in the dilapidated *murabba'ah* during the restoration process, which involves scraping the wall elevations to reveal this architectural and artistic feature.

The staircases

Staircases as essential architectural features in the design of *murabba'at* are given due consideration during the process of construction. They are an element of defence which serves to reinforce the ability to defend the *murabba'ah* against an enemy assault. As such, the design of the *murabba'ah* takes into account the kind of staircases that should be built for the structure and their location.

The external staircases

External staircases are found in the two-storeyed *murabba'at*. They were often connected to other living quarters or residential units within palaces, castles and fortresses. In these cases, an *iwān* or roofed passage may be found near to or in front of the *murabba'at*, since the external staircase, which was often built adjacent to one of the sides of the *murabba'ah*, served as a means to climb up and down to the first storey.

An external staircase leading to the entrance of the first storey was built with the same primary materials used in building the rest of the *murabba'ah*. The form it was given was often indicative of its value as an element of defence. It was either narrow or built as a spiral staircase winding around a column to restrict speed of movement. Such external staircases are found in other *murabba'at* in the living quarters and the service units, for example in the *murabba'ah* of Al Shāmsī in Sharjah and the residence of Sa'īd Bin Saqr Al Qāsimī in Khor Fakkān.

In a *murabba'ah* of only one storey, an external staircase may be located adjacent to the side of the

structure, leading to the roof of the ground floor. This allowed the occupants of the *murabba'ah*, notably in Mesopotamia, in northern regions of Saudi Arabia and in Yemeni villages, to use the roofs in the summer as a place to socialize in the hot evenings, or even as a place to spend summer nights. A wooden ladder may be used to reach the first storey, which could be placed and moved as needed. This is also another aspect of defence in the *murabba'ah*.

The external staircase of a one-storeyed *murabba'ah* was built with the steps winding around a column, with the wood of the steps fixed to the wall of the structure, making it more difficult to climb and thus rendering the *murabba'ah* better protected from attackers. This staircase could lead up to the roof of an *iwān* in front of the entrance to the first storey.

Internal staircases

This type of staircase leading to the various floors of the *murabba'ah* is another architectural feature with a defence function. It has various types: the fixed staircase, the wooden staircase and the vertical (straight) staircase.

The fixed staircase

This type of staircase is designed and built during the construction of the *murabba'ah*. It is incorporated into one of the interior sides, and links the ground floor to the first storey and the upper story to the roof. It was built with the same primary materials used for building the walls of the *murabba'ah*. It may be incorporated into one of the smaller sides of a rectangular *murabba'ah* or into one of the longer ones, but wherever it is placed the empty space beneath the steps is always used as storage space on the first storey. On the ground floor it was either closed up or may also have been used as storage space.

The exit opening of the staircase in the roof of the first or second storey is a square 80 x 80 centimetres, big enough to allow the passage of one person. Its location was planned during the construction of the roof. An empty space was left between the wooden parts and other materials of the roof. When constructed three sides of the square opening were ridged, the fourth side being

against the wall. A wooden hand grip (*maqbaḍ*) was fitted to the upper wall to help people climb through the opening.

During the construction of the fixed staircase, the steep and difficult climb was of no consequence to the designer, who took only the functional and defence aspects into account. The steps were often narrow and very high (18–20 centimetres). They were usually covered with mud and gypsum, the materials used for the interior of the *murabba'ah*. A wooden handrail was sometimes mounted all the way along the edge of the staircase to help users at night, or to help speed up the climb. This handrail may also have been fixed to the wall.

The wooden staircase

The wooden staircase is used to connect the floors of the *murabba'ah*. It is mounted adjacent to one of the walls and leads to an opening in the ceiling leading to the roof of the first or the upper storey. The opening is made in one of the corners of the *murabba'ah*.

To secure it, this wooden staircase may sometimes be fixed to the floor or to the opening on the roof to prevent it from slipping. It was usually made of two pieces of wood for the sides with wooden steps fixed with long nails that are attached and twisted over the sides from the outside, for increased durability. The distance between the steps ranges from 25 to 30 centimetres. The wooden staircase is rectangular. It is often wider at its base than at its top. This feature assures sturdiness since the load is distributed on the larger base. The dimensions of the wooden parts vary. The sides are either square or rectangular (8 x 10 centimetres), while the steps are smaller – less than 6–8 centimetres.

The vertical or straight staircase

This type of staircase is located in a corner. Wooden steps, 50–60 centimetres in length and 6–8 centimetres in depth, were mounted and fixed to the inner wall elevation and thus incorporated into the building 10–15 centimetres into the wall, to render it more sturdy. This staircase does not take up too much space in the *murabba'ah* and offered an additional element of defence. It occupied the least possible space in the corner of the

murabba'ah and was the vertical means of communication between the floors.

We sometimes find a square base adjacent to two sides in a corner of the *murabba'ah*, its size identical to the size of the opening in the upper ceiling. This is considered to be the first step of the staircase or its threshold. It is 20–25 centimetres above the level of the ground floor or the first storey. In addition, an elevation is often found in a corner of the first storey. Certain objects are often placed here, but it is also where the upper staircase exits from, as noted in the *Murabba'ah* of Sa'id Al Shāmsī.

The storeys of the *murabba'ah*

The design of a *murabba'ah* is defined by the objectives of building the structure: whether it is to be separate and secluded or incorporated into another building.

The one-storeyed *murabba'ah* is usually rectangular, with an entrance door at one corner and a fireplace in the middle of one of its longer sides, or in a corner. The fireplace could also be found in the centre of the *murabba'ah* for better heating in winter. In hot regions, the fireplace is located in a corner and was of no essential use except for preparing coffee or for light cooking. A small room may sometimes be built above the *murabba'ah*, especially the incorporated type. It has a moveable roof and is built for specific uses.

The type of *murabba'ah* determines the primary materials to be used in its construction. Mud, bricks, stripped palm branches and reed cannot be used in constructing a *murabba'ah* of more than one floor.

The multi-storeyed *murabba'ah* usually found incorporated into houses, palaces, castles and fortresses is built of stone or bricks. It usually has two or three storeys and the upper parapet is built with elevated sides in the form of supports for a light roof structure (a canopy) to protect from the heat of the sun. The guards use this place in the hot summer. The *murabba'ah*, or *majlis*, incorporated into such buildings as palaces, castles and fortresses is sometimes located on the first storey, the ground floor being the service quarters. If the *murabba'ah* is an incorporated structure, it is located

either in a corner or at the entrance, and sometimes in the middle of the building where all passages lead to it.

The one-storeyed *murabba'ah* is built according to the methods previously described, with sloping sides. It is a lofty structure, and its height ranges from 3–4 metres. The guest section is located in the middle with a catenary vault distinguished by a small entrance.

An example of a lofty *murabba'ah* can be found in the *qaṣabah* in the area of Al Murayjah in Sharjah, which features a fixed interior staircase built of stone and gypsum, located in the south-eastern corner of the structure.

In the incorporated *murabba'ah*, the interior walls have windows of various sizes and embrasures in the upper parts which overlook the inner courtyard. Some of these *murabba'at* have an interior staircase, while others have an exterior staircase either adjacent to one of the sides or under an *iwān* or canopy on the ground floor. The exterior staircase is usually a spiral staircase.

The first storey is 30–50 centimetres less in height than the ground floor, and it is less spacious due to the sloping wall elevations which are more evident from the outside than from the inside (a slight inclination of 10–15 centimetres), even with the plastering and occasional decorative frieze. Windows of various sizes are found in the walls of the first storey of a *murabba'ah*. If the *murabba'ah* is a separate secluded structure then the windows are found in all four walls overlooking the grounds in all directions. In the incorporated *murabba'ah*, the windows are in the open side, facing the outer square or the inner courtyard.

In one of the side walls of the first storey, but more often above the entrance, a machicolation is often located. It is a defence feature which allows for surveillance and detection of any movement or approach towards the entrance. It also has an opening through which to hurl boiling liquids on assailants. The machicolation could also be located in the walls of the ground floor of the *murabba'ah* above the windows, if there are any. However, the machicolation does not necessarily feature in all *murabba'at*.

An example of a two-storeyed *murabba'ah* is the *murabba'ah* of Qasr al Abyaḍ in the city of Manamah in the Emirate of 'Ajmān.

The loopholes

The existence of loopholes in various sizes and shapes is indicative of a *murabba'ah* built as a defence structure with architectural features designated for defence purposes. These loopholes could be found in the following shapes.

The vertical loopholes

Slits, 10–15 centimetres in width and 40–50 centimetres in length, are made in the wall elevations of the *murabba'ah* on the first and second storeys, and also the upper parapet. The vertical loophole is rectangular in shape. At the exterior it is of wider dimensions. It is located at a height of 40–60 centimetres from the floor, and enables the defender to see through and fire missiles at the enemy.

From within the *murabba'ah*, the loophole inclines towards the outside. This downward incline is steeper in some *murabba'at* than others and thus some vertical loopholes offer a better command of the exterior. The inside opening is 5–8 centimetres wide. This method better fortified the *murabba'ah* as it offered the defenders inside a commanding view of the outside without allowing the enemy to detect their movements, and also allowed them to aim their arrows and other weapons through the slits without hitting the guards.

In providing the *murabba'ah* with vertical loopholes, the design must take into account the following elements to strengthen the defence capability:

- i the rectangular opening is narrower on the inside than it is on the outside;
- ii the downwards slope of the slit towards the outside should be steep, at least to a degree that allowed surveillance of the front courtyard of the structure and any approaches towards the walls;
- iii the rectangular opening on the inside should be inclined to a degree that prevented direct passage of projectiles to the inside;
- iv the defenders could be given a better view if the outside opening is made larger;
- v finally, for better fortification, the vertical loopholes were made with the same materials used to build the rest of the *murabba'ah*. No wood or other materials

are used, and the upper rectangular opening is set during the construction of the wall elevation.

The horizontal loopholes

There are also horizontal loopholes which function as surveillance points. Some are level with the floor of the first storey or pierce through the ceiling of the first storey or the roof of the second storey. They are often located above the entrance through which to watch approaches to the *murabba'ah*, or to pour boiling liquid onto an enemy assailing the entrance.

The horizontal loopholes are made as the walls are constructed, using the same primary construction materials. They are 60–80 centimetres in length and 5–7 centimetres in width, and the opening is narrower at the top than at the bottom to allow a wider view and provide a larger targeting area.

These horizontal loopholes were useful for the defence of structures such as forts, castles, palaces and *murabba'at*. When the enemy came close to the walls, it became easy to strike with arrows or boiling liquids. A good example is Qasr al Ukhaidir in the western desert in Iraq. Dating from the middle of the second century of the Hegira, it has horizontal loopholes in the ceiling of its entrance hall and also in the passage of the exterior wall (*sūr*), at the top of the niches. Such horizontal loopholes are also evident in Khān al Raḥbah (built in the twelfth century of the Hegira), the *murabba'ah* of al Rams and the *murabba'ah* of the Jazīrt al Ḥamrā fortress in the Emirate of Ra's al Khaymah.¹

Though of limited use in the defence of the *murabba'ah*, these horizontal loopholes are considered to be useful additional elements of defence. Like vertical loopholes, they are often found in structures such as forts, castles and palaces and in large houses serving as residences for rulers and tribal shaykhs, and especially in multi-storeyed *murabba'at*, in enclosure walls and entrances. But they are not found in the *murabba'at* that serve as reception halls or guest houses (*rab'āt*) which only have a ground floor.

The circular loopholes

Circular loopholes used as surveillance points traverse

the thickness of the walls on the first and second storeys and in the upper parapet of the *murabba'ah*. They are distributed in all the wall elevations of the structure in accordance with the level of defence required. They allowed the defenders to command the grounds around the *murabba'ah*, whether it was a separate secluded structure or connected to part of a building – the design should consider that the defence action needs to be through the openings in the wall elevations commanding the area outside the *murabba'ah* rather than through those overlooking the inner courtyard.

The circular loopholes are built during the process of constructing and aligning the walls of the *murabba'ah*, using the same primary materials. They are often distributed horizontally, parallel to the floor, at a height convenient for the movement of the defenders within. The height of the circular loopholes differs from one storey to another, including the upper parapet. The height of the circular loophole could range from 60–80 centimetres. As for their horizontal distribution, the circular loopholes are located in various places between the vertical loopholes. So for example there could be one circular loophole between two vertical loopholes, or one vertical loophole between two circular ones. This distribution differs when there are windows overlooking the area outside the *murabba'ah* – in which case the location of the circular loopholes is determined by the existing space and the correctly measured distance between the windows.

The number of circular loopholes in the *murabba'ah* varies. It depends on whether or not there is a door, a large window, embrasures or a machicolation. Such

elements would determine the location and number of the circular loopholes. They are more numerous in the upper storeys, but are also found in *murabba'at* with only a ground floor (i.e. reception halls or *rab'āt*). In such *murabba'at*, the circular loopholes were used for viewing, ventilation and airing the interior.

While the construction of the circular loopholes was done during the construction of the walls, their size, shape and location were designed in advance. They are very often horizontally aligned with the base of the vertical loopholes. Their location from the interior is at a height which offered the defenders a commanding view of the outside and a useful range of vision. The opening of the loophole could clearly be seen from the outside between the vertical loopholes. They are built with an incline to the front or the side to offer a commanding view to the corners of the *murabba'ah* or building.

The circular loopholes were built with an incline sloping from the top downwards (i.e. from the inside towards the outside). The length of the loophole depends on the depth of the wall and the degree of incline. The diameter of the circular loophole ranges from 10–12 centimetres on the inside and from 12 to 15 centimetres on the outside, and sometimes has a chamfered (or bevelled) edge.

Vertical and circular loopholes are grouped together in a certain part of the building for surveillance and for commanding the surrounding area like at a border point. This was usually in one corner of the building in one of its upper storeys. A good example is the shade parapet (*ẓallab*) on the roof of the upper storey of the *murabba'ah* in the fort of Maqṭa'.

The dimensions of circular loopholes

Construction material	Location	Diameter from the interior (in cm)	Diameter from the outside (in cm)	Remarks
Mud	Ground floor	10	15	Regularly placed within the wall
Sun-dried bricks	Ground floor	10	15	Regularly placed within the wall
Reed	–	–	–	A small opening for viewing
Baked bricks	First storey	8–10	10–12	Sloping towards the exterior
Stone (coral and mountain)	First storey	8–10	10–15	Sloping towards the exterior

The triangular loopholes

Triangular openings in the façade could have the two sides resting on the base or they could be inverted. This type of loophole functioned as a means for watching the grounds and ventilating the *murabba'ah*, as well as allowing in daylight. Such triangular loopholes are found in some *murabba'at* in the Gulf region, and especially in the UAE. They are located in the lower parts of the building near the floor of the first storey or in the upper part of the ground-floor wall. The lower-placed openings functioned as means of surveillance, while the upper ones served to ventilate the *murabba'ah* and allow in daylight.

These loopholes are either equilateral or isosceles triangles. They offer the defending guards a commanding position of the grounds, and the angle helped them change their targets during engagement with an enemy in the foregrounds of the *murabba'ah*.

Machicolations

Machicolations are found in the front elevation of the *murabba'ah* above the windows and entrances. Its aligned position with these features allowed a commanding view over the immediate area around the *murabba'ah*. It is an important element of defence, and its lower opening was used by the defenders to fire their arrows or pour boiling liquids on assailants when they were close to the *murabba'ah*. The machicolation can be seen from the outside in the front elevation of the *murabba'ah* and in its upper parts, if the structure has more than one storey. It may also be found on all four sides of the *murabba'ah*, depending on the location of the entrances and windows.

The machicolation was built during the process of constructing the wall elevations of the *murabba'ah*. Pieces of wood (of different kinds and sizes) were mounted into the wall to stick out through the front elevation in a sloping fashion as two sides of a triangle, the base being the surface of the wall. The two sides would meet at an acute angle to form an isosceles triangle. After mounting the protruding pieces of wood, the primary materials were laid. These are the same as the materials used to construct the wall elevations. Mud or gypsum is used

for bonding the building materials. The wood was also coated, but the triangular shape of the sides was preserved. The sides were then brought closer until they formed a line at the top – the overhang of the machicolation. This low protective wall along the edge of the machicolation was important for sturdiness during an attack.² Some *murabba'at* are not furnished with machicolations and defence depends instead on the windows which overlook the grounds, especially those above the entrance of the *murabba'ah* and the other types of loopholes.

The size and dimensions of machicolations may vary, but they all have a similar shape even if they are built with different construction materials. They have the same lower opening necessary for defending the doors and windows. The sloping sides are a fortifying element. They are incorporated in the construction of the wall elevation to reinforce the sturdiness and resistance of the structure. Architecturally, the shape and size of the construction materials may vary, but the objective remains the same – to provide the *murabba'ah* with elements of defence to ward off an enemy attempting to approach its entrances and openings.

Niches and alcoves

Niches and alcoves are found distributed in the inner wall elevations of the *murabba'ah* – whether it is of one or several storeys. Their size and dimensions vary. They had a service function for the occupants of the *murabba'ah* (the guests and guards). But they also have an architectural advantage in that they help strengthen the walls. These recesses are of two types: either a vaulted alcove, or square or rectangular of various sizes. The uses of these various alcoves and niches within the *murabba'ah* may be summarized as follows. Firstly, they were used as service recesses for storing the guards' personal effects, as a shelf on which to place a lamp, or as an area for storage of defence equipment, foodstuffs or clothes. Secondly, they have architectural and construction purposes. These include the fact that the vaulted niches render the walls more sturdy, that the use of wood in the roofing of the niches also reinforces the walls and on a basic economic level, the greater the number of alcoves

and niches in the design the fewer building materials used. Finally the provision of niches and alcoves means that the load of the structure lessens.

Vaulted niches

Vaulted niches are found in the inner walls of the *murabba'ah*, sometimes on both the ground floor and the first storey, but sometimes only on the ground floor. Their size may differ from one *murabba'ah* to another (in length, width and depth). The location of the niche in the wall may differ with respect to floor level. Some niches are closer to the floor, some 50 centimetres above it. However they would be located higher on the first storey, 120–150 centimetres from the floor. Most niches and alcoves are close to the floor on the ground floor. They are convenient recesses for the occupants to use however they wish. Sometimes this type of niche is found in a corner of the *murabba'ah*. It was used as a fireplace with the opening going through the wall to provide an exit for the smoke. A chimney would sometimes be built, extending above the roof.

When making the niches, the first thing to do was determine their width and depth during the construction of the wall. The height was then determined and the niche was made square or rectangular depending on what was required. An arch was then mounted spanning the top of the recess. It was usually slightly tapered or curved. The form of the arch was designed in advance and built with the same materials used for constructing the rest of the *murabba'ah*. After fixing and building the arch over the top of the niche, construction continued behind the arch to build the vault. The niche with its arched top was completed with the construction of the sides. The exterior wall of the niche (the back) is often thick, ranging from 15–20 centimetres, in anticipation of defence needs.

The arch of the niche may come in different shapes. It can be semi-circular, with the radius greater than half the width of the recess. The curved arches usually have three lobes. Regardless of the shape of the arch, the construction of the niche in the above described methods requires a wooden mould to control the shape, dimensions and size. On completion of the niche the

wooden mould was removed and the surface of the vault was daubed with the construction material. Work on the side walls of the *murabba'ah* was then resumed. Finishing off the niche was done along with the rest of the *murabba'ah* walls. It was plastered or painted with the same materials used for the walls.

The niches are distributed in the wall elevations which have no openings – neither doors nor windows, loopholes nor machicolations. They are often symmetrically placed, and their number depends on what other architectural features there are in the walls of the *murabba'ah*. For example, if there are windows then the niches are distributed between them.

The lobed arches of some niches serve an architectural purpose. They give structure to the wall as well as being aesthetically pleasing, and are constructed in the same method described above, using the wooden mould to cast the required shape of the arch. Niches may sometimes be found with an oyster-like recess. They are called oyster-niches, but do not differ from other niches in purpose or function, nor in the method of their construction. The niches are divided according to their depth, arch and vault into two types: those with a single semi-circular tapered arch, a lobed arch, or an arch with a pointed top; or those with an arch at the top and a deep vault formed in keeping with the shape of the arch at the front of the niche.

Square or rectangular recesses or alcoves

There are square or rectangular recesses in the interior walls of the *murabba'ah* of various dimensions and that are located at different heights from the floor. These recesses may be found on the ground floor of the *murabba'ah*. Their number varies according to the prevailing conditions of the *murabba'ah*'s location, and whether the *murabba'ah* is integrated into structures such as a *ḥuṣn*, palace or house within the town or *qaṣabah*, or a separate secluded structure integrated into a fort for defence purposes.

Alcoves, big or small, are of two shapes: square and rectangular. The purpose of these alcoves is similar to that of niches previously described – being functional and structural, but they differ in dimension and method

of construction. Square recesses are often found in single-storeyed *murabba'at* (the *rab'ah* or guest house). They are usually quite small (80 x 80 centimetres) and their depth could vary depending on the thickness of the *murabba'ah*'s walls. Rectangular recesses could reach the floor and their location varies. They function according to the needs of the occupants, and are especially made use of to store long weapons.

Whatever their size, the location, width and depth of the square or rectangular recesses are determined during the process of building the interior wall elevations at the completion of each horizontal course. Once construction has reached the height required to build the recess it is then roofed or covered with any available wood (*murabba'* wood, *shandal* stalks, palm fronds or local tree wood). The wood is treated and topped with cane, palm stalks and branches. Layers of binding material would then be spread and levelled before resuming the horizontal construction of the wall, which continues until the height required for the ceiling is reached.

The battlements (crenellations)

The battlements at the top of the *murabba'ah* are of different types and shapes. They surround the top of the *murabba'ah* on all sides. The walls of the *murabba'ah* are built tapering inwards and therefore wider at the base than at the top. Upon completing the construction of the *murabba'ah*, with the features of each floor defined and the roof finished, construction of the upper parapet and battlements is begun.

Construction of the battlements is similar to the construction of ramparts surrounding courtyards or the grounds of buildings. It differs in that the parapet includes defence elements such as loopholes of various types and crenellations in various forms which have both aesthetic and defence functions. The crenellations in the upper parapet are different in shape and size. The parapet may be called a crenellated parapet or even a toothed parapet (like the teeth of a comb).³ The parapets provide safety for the defenders as they stand watch, screened by the crenellations.

In constructing the crenellated parapet or battlements on all four sides of the *murabba'ah*, spaces are

provided for the supports of the watch room or shelter and also for the supports of the parapet's corners which are usually extremely large. The battlements are of three types: battlements with a canopy, battlements with a corner guard room (*zawiyyah*) and plain battlements.

Battlements with a canopy (*zallah*)

These roofs of the *murabba'ah* are integrated into the parapet or the battlements, and have an elevated structure raised on square or other shaped supports. These supports differ in number but the canopy is often raised on four supports and located in a corner by the parapet. The canopy is an architectural feature with a special function. It served the defenders of the *murabba'ah* and provided them with protection against the heat of the sun in daytime and against rain in winter. Its height was adequate enough to enable the occupants to move freely and survey the grounds through the loopholes or the opening between the roof and parapet. Its height may range from 1.8–2 metres, and the roof was either fixed and similar to the roof of the *murabba'ah* or was light and dismountable and made of wood, palm fronds (*du'un*) and matting as a protection from the summer heat. In some *murabba'at*, the supports are in the corner or the middle of the wall to help mount the canopy structure temporarily and remove it when it is no longer needed.

Battlements with a corner room

A small room was sometimes built in a corner of the *murabba'ah*'s roof and included the most important defence elements such as loopholes of various types. With such elements the room could also be used as a surveillance post since it commanded the area around the *murabba'ah*. It could be located in a spot where it could command the roads leading to the town or other important nearby locations. When built in a corner, this room, combined with the crenellations, may have been a very helpful defence element for both the *murabba'ah* and the surrounding area.

Among the well-known examples of this feature is the structure of Al Maqta' fort, whose location was parallel to the Al Maqta' tower in Abu Dhabi. Its architecture and design can be described as follows. The side walls

were integrated into the roof's parapet. The lower part was square in shape, with vertical loopholes distributed in the two elevations overlooking the exterior. In the corner where these two elevations of the battlements are aligned, there was an excellent defence feature. A slanting bevelled vertical loophole provides a commanding view over the area. It is of a remarkable design for a defence-oriented structure, demonstrating the degree of skill, knowledge and precision in constructing buildings with defence elements, that left no gap open for the enemy to exploit. This room is entered from inside the *murabba'ah*'s roof and its entrance is usually narrow for defence purposes.

The second (upper) part of the structure is a watch room, also square in shape and smaller than the lower part. Circular loopholes distributed in the walls were in a triangle formation. It is an element of defence which allows the guards to make out the number of an approaching party and to determine their targets, near and far.

The third part of the watch room structure is a dome, semi-circular in section. The corners of the square base take an octagonal-shaped drum to enable construction of the a dome.⁴ Semi-circular domes constructed as a cover for watch rooms can also be found in other fortresses, *ḥuṣūn* and *khans* (caravansaries). A high pole is mounted on top of the dome as a guiding landmark. The height of the watch room is the sum total of the height of the battlements from the roof of the *murabba'ah* (1.2 metres), the height of the first level (approximately 1 metre), the height of the second level (80 centimetres) and that of the dome (60 centimetres) – i.e. 3.5–3.6 metres.

The watch room was another fortifying element of the defences of the structure, complementing the battlements commanding the grounds from all sides. It also accommodated the defenders and gave them an edge over the enemy.

Battlements with no crenellations

This third type has no crenellations, but included other defence elements such as the vertical and circular loopholes and a watch room in one corner of the roof. *Murabba'at* in different locations have differing levels of defence. These could have been dictated by particular

needs, the degree of stability prevailing in the area and the fortifications required.

Stakes and furniture

Among the elements noted in the structure of the *murabba'ah* are the wooden stakes inserted into the walls from the interior during the process of construction which protrude at a height of 1.2–1.5 metres to a length of 60–80 centimetres. These are used by the guards to hang their weapons, clothes and even food, usually dates, with which they were supplied as an emergency foodstuff. Short hooks of different shapes are fixed to these protruding stakes. They are found on the *murabba'ah*'s ground floor and first storey, distributed among the niches at the same level.

In one corner of the *murabba'ah*, there is a square platform borne by wooden columns, 60–80 centimetres high, with wooden planks laid over the top. This platform was used to accommodate sleeping mattresses, and the space below was used to store simple cooking utensils or foodstuffs. This feature is found in the separate secluded *murabba'at* and some forts. Sometimes, a fireplace was built into one of the smaller sides of the *murabba'ah*, or in one of its corners. It is usually quite small, but proportional to the spaciousness of the *murabba'ah*, and served the immediate needs of the guards, such as preparing coffee or heating in cold weather. Fireplaces were also placed in the centre of the *murabba'ah*, especially on the ground floor. The *murabba'ah* may include other functional elements to serve the guests or guards. These could take the form of recesses or cavities in the walls in which to place a pitcher of water or liquid supplies such as molasses or ghee, and are usually found on the ground floor.

The furniture of the *murabba'ah* differs from one place to another, depending on the area where the *murabba'ah* is located. The *murabba'ah*, whether a *rab'ah*, *majlis* or *maḍīf*, was provided with mattresses for the occupants to sit on the floor cross-legged. Cushions were placed on these mattresses to lean back against and rest on for increased comfort. The floor was covered with mats made of reeds or a plaitwork of palm leaves, or with locally made rugs or imported carpets, depending

on the means of the occupants or owner of the *murabba'ah*. In one corner of the *murabba'ah* the rolled-up *simāt*, a long mat, or a round *mansaf* were stored and spread out at meal times or on special occasions, such as when guests were to be received or a local meeting was to be held.

Whether the *murabba'ah* is used as a guest house and is located far from a town or populated areas, or if it is part of a military building such as a fort or a castle, or is a separate secluded structure, the furniture was usually simple and served the needs of the guards.

A stall to tie up horses or an area to house animals was located at a small distance from the *murabba'ah*. This *barraḥab*, as it is sometimes called, is protected from the direction of the wind blowing towards the *murabba'ah*. If the *murabba'ah* is connected to buildings such as a fort, *ḥuṣn* or palace, then the service areas are found within the living quarters. The *murabba'ah* assumes a distinguished status on special occasions such as religious feasts, the fasting month of Ramadan, wedding celebrations and the arrival of guests from faraway places. Additional pieces of furniture were brought out, the grounds were swept clean, tribal flags were raised and a fire was lit outside to indicate that ample amounts of food and coffee were available. Candles or lamps were lit inside and outside the *murabba'ah* and at the entrance. Palm branches were used to decorate the *murabba'ah's* doors and windows.

The *dakkah* (seat)

The *dakkah* was an architectural feature integral to the design of *murabba'at*, reception halls, *majālis* and guest rooms (*maḍāyif*). The outdoor *dakkah* extends along the walls on the exterior, and could be on one or two elevations of the *murabba'ah*, but was often on the front wall where the entrance is located. It is constructed with the same building materials as the *murabba'ah*. When constructed the *dakkah* is built up from the foundations of the walls, adding to their sturdiness and resistance to attacks and to natural effects such as the erosion of foundations and walls.

The dimensions of the *dakkah* vary. It is usually around 80 centimetres in width and 60 centimetres in height and the length depends on the length of the

wall, or is determined according to need. If the *murabba'ah* is located in a village, town or *qaṣabah* and incorporated within the *ḥuṣn* or palace, this architectural element was essential, and care and precision of its form and dimensions was manifest. But if the *murabba'ah* is a separate secluded structure or was within a fort designated for guards, then the *dakkah* was less elaborate and more simple.

The creation of a prop to lean against at the end of the bench could sometimes be taken as an indication of stability prevailing in the area where the *murabba'ah* is located. Used for sitting or relaxing and watching the world go by during the day the guards would also use it to sleep or rest upon. Mats or rugs were spread out on it, and it was covered more elaborately on special occasions.

Buttresses were built around the base to reinforce the walls and render them more resistant to enemies attempting to destroy the *murabba'ah*. Separate square supports were sometimes employed, similar to pilasters, to consolidate the foundations and wall elevations. Surrounding the structure of the *murabba'ah* like an attached slanting wall, the buttress height ranged from 1.2–1.5 metres. The construction materials used were the same as for the *murabba'ah* walls.

Painting and flooring

The method of covering the wall elevations from the inside and the outside with binding materials such as gypsum (or clay) was by coating, padding, painting or plastering. The *murabba'ah's* wall elevations are coated after articulating the sides of the openings of the doors, windows, machicolation and other defence elements such as the vertical, horizontal and circular loopholes and crenellations. The same binding material is used everywhere. But the plastering process is often lacking in consistency – a thicker layer would be applied on one of the sides, especially in the case of the defence outpost *murabba'ah*, and more than one layer of plaster could sometimes be applied on the inside of the walls, particularly to even or smooth over the surfaces in the more distinguished reception halls (*majālis* and *maḍāyif*). Coating strengthens the walls as it fills up any gaps in the elevation, in addition to rendering them more attractive

with carved designs and patterns.⁵ The woodwork of doors, windows and ceilings was painted depending on the status of the structure.

The flooring of the *murabba'ah*'s ground floor and the first storey was done with gypsum or clay. The floors were sometimes tiled with solid materials such as stone or baked brick, or a thick layer of gypsum. Rugs and carpets were laid over the floor. Plastering with gypsum allowed for simple ornamentation in certain sections of the *murabba'ah* – in the *majlis* or reception hall and the

guest areas. But this occurs only in *murabba'at* built within fortresses and palaces, towns or *qaṣabahs*, which have a social function in addition to being defence structures. Patterns were also found on the wooden frames of doors and windows. Windows on the first storey, overlooking the area outside the *murabba'ah*, were adorned with iron latticework in different designs. In the absence of this the window woodwork was made in carved ornamental screens.

Construction materials

The *murabba'ah* is built with the materials available in the area. The use of these materials and the method of construction are determined by the process of design.

The better-known materials used to build *murabba'at* in the Gulf region were coral-reef stones, used especially in areas that were either coastal or distant from mountains. For want of rocks the inhabitants exploited the coral reefs. Coral rocks were dried first before use in construction. Gypsum was the binding material, extracted from burning coral stones and mixing the product with sand. A quantity of hardened 'ṣārūj was also obtained from the burnt clay used in the process.¹ Imported wood was used for the doors and windows, and for the ceilings,

known as *shandal* wood. Clay brick and mud were also available and easily accessible materials. They could be extracted from the construction site itself if the soil happened to be the right kind – as in the site of *murabba'ah* al Dayd and *ḥuṣn* in Sharjah, the Ḥatta buildings in Dubai, and the *Murabba'at* al Qaṣīdāt in Ra's al Khaymah. Palm-leaf stalks were sewn over the *shandal* wood while building the ceilings and roofs and plaitwork of palm leaves for mats woven locally were used for floors and ceilings.

Other imported materials used were mountain stones, baked bricks, sun-baked mud brick, mud and cane. A mixture of these were also used in construction works.

The purposes and uses of the *murabba'ah*

The *murabba'ah* as an architectural element distinct in planning and details, and peculiar in size and form, was built for particular functions in two types.

The secluded *murabba'ah*

This type of *murabba'ah* was a tall structure with distinctive features that could be seen from far away, especially in desert areas where it would not be concealed by trees or hills. The secluded *murabba'ah* was originally built on the outskirts of cities and towns. It was also built in the midst of residential units as a separate structure, not connected to any building.

The incorporated or connected *murabba'ah*

This second type of *murabba'ah* was built adjoined to living or service units, with its sides visible depending on its location in the building plan of the whole structure. It may have been located on the first floor, above the entrance, in the corner or in the middle. Its location within the structure, along with its design and architectural elements, enhanced the defence and protection, especially when the structures are fortresses in remote or desert areas, or when they are palaces of rulers or officials, located in densely populated areas in the towns. The *murabba'ah* had a social function as a *majlis*, reception hall, or a meeting place for men who reside close by.

The most important functions of the *murabba'ah* are as follows.

A watch post

The *murabba'ah* with its commanding view served to give advance warning of the arrival into the area of individuals or groups. Occupants could identify the newcomers, the intentions of an approaching crowd and any movements in the vicinity of the *murabba'ah*. Its position and height assisted travellers in determining the location of the town, and the coastal *murabba'ah* functioned as a lighthouse for incoming ships.

The *murabba'ah* was essentially designed for viewing the vicinity and for the surveillance of the surrounding area, whether as a separate secluded structure or an observation post for guards incorporated into a residential unit.

A defence unit

The *murabba'ah* as a defence structure in design and form facilitated the function of defending the surrounding area. The elevated two-storey structure, with battlements or crenellated parapets and loopholes, the absence of windows and other openings on the ground floor, were all elements that strengthened the position of the defenders within.

The door of the *murabba'ah* was closed at night and the guards would climb to the roof for watch duty and others took position by the windows and other openings.

A meeting place

The structure of the *murabba'ah* and its location occasionally encouraged its use as a meeting place for the men-folk, often at night time, or for feasts and religious occasions – such as the evenings during the holy month of Ramadan. At such gatherings stories would be told, heroic episodes recounted and cultural topics as well as communal problems would be discussed. Businessmen and merchants met there to conclude deals. Celebrations such as weddings and banquets in honour of guests were held there.

A *murabba'ah* of this type can be seen on the first floor of al Muraykhī House (or the Pearl Centre) on Dalmā island,¹ adorned with several windows and two entrances. The commanding position it occupies on the island near the shore allows it to function as a guide for incoming ships, and so is indicative of its defence function as well. But since being on an island is a protection in itself, the architectural design did not provide for loopholes and other defence elements. Instead, there

are numerous windows on all four sides, for better surveillance and observation of the movements around the structure.

This particular *murabba'ah* is informative. It confirms that the design of a *murabba'ah* or a *majlis* need not necessarily include all the characteristic defence elements, since an architectural design providing for these elements would depend on factors particular to the location in which it was built; the above example is particularly pertinent to areas characterized at the time by social, economic and political stability.

Repository for weapons and other valuables

The structure of the *murabba'ah* and its location allow for its use as a safe storage place for valuable and important commodities, especially weapons and other defence equipment. It may also serve as a storehouse for foodstuffs in anticipation of hard times or a state of siege.

A separate *murabba'ah* structure located on the outskirts of a town or *qaṣabah*, or on the coast, would often be used as a weapons repository or a storage facility for foodstuffs that could be stored for a long time, such as dates and grains. However, a *murabba'ah* incorporated into a palace or a *ḥuṣn* was used as lodgings for the defenders as well as a storehouse on the ground floor.

The *murabba'ah* could be made use of to detain or jail people temporarily or otherwise, depending on the circumstances prevailing in the area – especially when it was located near the seat of authority (i.e. the Shaykhdoms); evidence of this can often be seen in the railing of the prison cell to which the prisoner's feet would have been manacled. This anachronistic device consisted of a long grooved wooden pole into which the prisoner's foot was fitted and then held in place by a long iron bar which was made to pass through the grooves the whole length of the pole, and then padlocked and laid on the floor.

The *murabba'ah* in Sharjah

There are a number of heritage buildings in Sharjah that incorporate in their architectural design functional units such as the *murabba'ah*, a distinct architectural element in structures such as fortresses and palaces, and in a number of village or town houses. A type of *murabba'ah* is also found in defensive forts. These *murabba'at* were built as places to receive guests and to hold meetings, in addition to its general function as part of a defence structure.¹

Murabba'at in these heritage buildings in Sharjah still stand with discernible details. But several of them show the effects of erosion and neglect, having been abandoned by their owners who have long since moved into modern buildings in other areas. Ignorance, neglect and misuse took their toll on these structures. The

architectural and aesthetic elements of the *murabba'at* have been defaced, their artistic features distorted with the introduction of new construction materials and the closure of entrances or the addition of new ones to suit the new altered usage of the buildings. As a result some of these *murabba'at* were divided into residential units, their openings closed and new staircases added. Ceilings were also raised and most windows and doors ripped off.

Since elements of all the *murabba'at* are similar, to avoid repetition we shall take one *murabba'ah* as an example and explain its architectural and artistic elements. This shall be *Murabba'ah Sa'id al Shāmsi* (al Ṭawīl) in Sharjah, since it is still standing and incorporates most of the common elements to all. We shall also explain the methods employed in the restoration work.

Name	Location	Building condition	Primary materials	Remarks
Murabba'ah Al Shūyuk	Al Murayjah		Possibly sea rock, gypsum rock, palm frond mats, palm stalks and shandal wood	Opposite to the castle of the Qawāsim tribe in Sharjah
Murabba'ah Ibn Kāmil	Al Murayjah	Obliterated	Possibly sea rock, gypsum rock, palm frond mats, palm stalks and shandal wood	Opposite to the castle of the Qawāsim tribe in Sharjah
Murabba'ah Taryam	Al Murayjah	Obliterated	Possibly sea rock, gypsum rock, palm frond mats, palm stalks and shandal wood	Opposite to the castle of the Qawāsim tribe in Sharjah
Murabba'ah Ibn Darwish	Al Murayjah	Obliterated	Possibly sea rock, gypsum, palm frond mats, palm stalks and shandal wood	Opposite to the castle of the Qawāsim tribe in Sharjah
Murabba'ah Al Sharjah (<i>ḥuṣn</i>)	Al Murayjah	Obliterated	Possibly sea rock, gypsum, palm frond mats, palm stalks and shandal wood	Only a tower still stands
Murabba'ah Al Shāmsi (<i>Sa'id al Ṭawīl</i>)	Al Murayjah	Average	Possibly sea rock, gypsum, palm frond mats, palm stalks and shandal wood	Restoration under supervision
Murabba'ah Al Shāmsi (<i>Sa'id al Ṭawīl</i>)	Al Murayjah	Obliterated foundations	Possibly sea rock, gypsum rock, palm frond mats, palm stalks and shandal wood	Of medium size; will be rebuilt after excavation
Murabba'ah Al Shāmsi (<i>Sa'id al Ṭawīl</i>)	Al Murayjah	Obliterated foundations	Sea rocks, gypsum, shandal wood, palm frond mats and palm stalks	Small; will be rebuilt after excavation
Murabba'ah Al Qasabah	Al Murayjah	Average	Red stones, sea rocks, gypsum, palm frond mats, palm stalks and shandal wood	Being restored under our supervision ²
Murabba'ah (?)	Al Murayjah – west	Obliterated	Red stones, sea rocks, gypsum palm frond mats, palm stalks and shandal wood	Needs excavation to find its location ³

Murabba'ah (?)	Al Murayjah – west	Obliterated	Red stone, sea rocks, palm frond mats, gypsum, shandal wood and palm stalks	Require excavation to determine locations
Murabba'ah al Layyah, owned by Sayyid Majran bin Ahmad	Al Layyah – Sharjah	Obliterated	Probably red stones, sea rock, gypsum, palm frond mats, palm stalks and shandal wood	Needs excavation to determine its location
Murabba'ah 'Ali Bin Rashed	Al-Khan – Sharjah	Average	Sea rocks, gypsum, palm frond mats, palm stalks and shandal wood	Restored in part
Murabba'ah 'Isa Bin Jarash	Al-Khan – Sharjah	Average	Sea rocks, gypsum, palm frond mats, palm stalks and shandal wood	Needs a plan for future restoration
Murabba'ah Ḥuṣn al Ḥamriyyah	Al Ḥamriyyah	Obliterated	Sea rocks, gypsum, palm frond mats, palm stalks and shandal wood	Was possibly built with the primary materials available
Murabba'ah Ḥuṣn Dibā	Dibā al Ḥuṣn	Only foundations remain	Sea rocks, gypsum, palm frond mats, palm stalks and shandal wood	Extreme damage perpetrated here. A new square was built within a local police station ⁴
Murabba'ah Ḥuṣn al Dhayd (Ḥuṣn al Shari'ah)	Al Dhayd	In ruins	Clay brick, mud, gypsum plastering and mountain stones for the foundations	Needs protection and restoration ⁵
Murabba'ah Ḥuṣn al Dhayd (Qal'at Tawī al 'Arqūb)	Al Dhayd	In ruins	Clay brick, mud, gypsum plastering and mountain stones for the foundations	Needs protection and restoration
Murabba'ah Ḥuṣn al Baḥāyish	Al Baḥāyish	In ruins	Mountain stone and gravel	Needs excavation and documentation
Murabba'ah Ḥuṣn al Madām	Al Madām	Wall foundations only remain	Mountain stone and gravel	Needs excavation and documentation
Murabba'ah Ḥuṣn Fily (a fort)	North of Wadi al Madām	Wall foundations only remain	Mountain stone and gravel	Needs excavation
Murabba'ah Qal'at al Wathan (two murabba'āt)	Khawr Fakkān	Foundations obliterated	Mountain stone and gravel	Damage due to urban expansion
Murabba'ah Ḥuṣn Kalbā'	Kalbā'	Foundations and wall remain	Mountain stone, sea rock, gypsum, palm stalks and shandal wood	Restoration under our supervision
Murabba'ah Bayt al Shaykh Sa'id al Qasimi	Kalbā'	Average	Mountain stone, sea rock, shandal wood, gypsum, palm stalks and palm leaf mats	Restoration under our supervision
Murabba'ah Ḥuṣn Khawr Kalbā'	Kalbā'	Foundations	Sea rock, gypsum, palm leaf mats, palm stalks and shandal wood	The foundations would probably appear during the excavation of the fortress area

The *murabba'ah* of Sa'id al Shāmsī (al Ṭawīl)

This *murabba'ah* is part of a large house in the area of Murayjah. During excavations two *murabba'at*, one large and one small, were found on the western side of the house.

The house is located in the old part of Sharjah, the city's bustling social, economic and military centre. This part of the city accommodates the *sūq* (al 'Arsah), the

school, the palace of the Qawāsim Shaykhs and most residences of the Emirate's notables such as al Mudafa'a, Bayt al Nābūdah, Jum'ah al Muṭawa', al-Nūmān, al Mary and Bayt al Arabī (al Muqaṣṣabah), their residences structurally homogeneous in their architectural elements and the construction materials used.

As a structure, the *murabba'ah* of Sa'id al Shamsi (and those in other notable houses in the areas of al Shahwiyyin and al Murayjah in Sharjah) is typical of the

architecture of the heritage buildings in the city of Sharjah and the United Arab Emirates.

The still visible part of this *murabba'ah* consisting of a few partition walls and foundations of the walls does not represent the entire structure which was originally larger. Once the site was cleaned, the encroachments were removed with the modifications, and the area excavated, after partially diverting Salahiddin Street which had traversed the western part of the house. The removed section represented a medium-sized, 50 square metres *murabba'ah*, and a smaller one of 20 square metres, with rooms in between and a staircase, in addition to a northern entrance and the main entrance located on the southern side adjacent to the existing western side of the *murabba'ah*.

The *murabba'ah* is located on the south-eastern side and is 5 metres from the eastern corner of the house. It is a rectangular *murabba'ah* of 50 square metres, comprising two storeys with an entrance (2.10 x 1.10 metres) at the northern side, leading from the ground floor to the *iwān* (the *liwān*) – a roofed gallery supported by five square pillars (80 x 80 centimetres), the foundations of which were discovered during the excavations, along with parts of the staircase at the eastern side of the *iwān*.

The entrance of the *murabba'ah* on the first storey leads to the roof of the *iwān*. The first storey is reached by a staircase from the exterior and through the *iwān*; this staircase leads to the upper roof of the *murabba'ah*, and is incorporated into its northern and eastern walls.

Windows are located on the northern, eastern and western walls of the ground floor, and on all the first floor walls – a total of 19 windows. The windows, 60 x 90 centimetres each, are of iron grille encased in wooden frames, ornamented with traditional designs in geometrical and floral leaf patterns.

The distribution of windows on the four walls of the *murabba'ah*

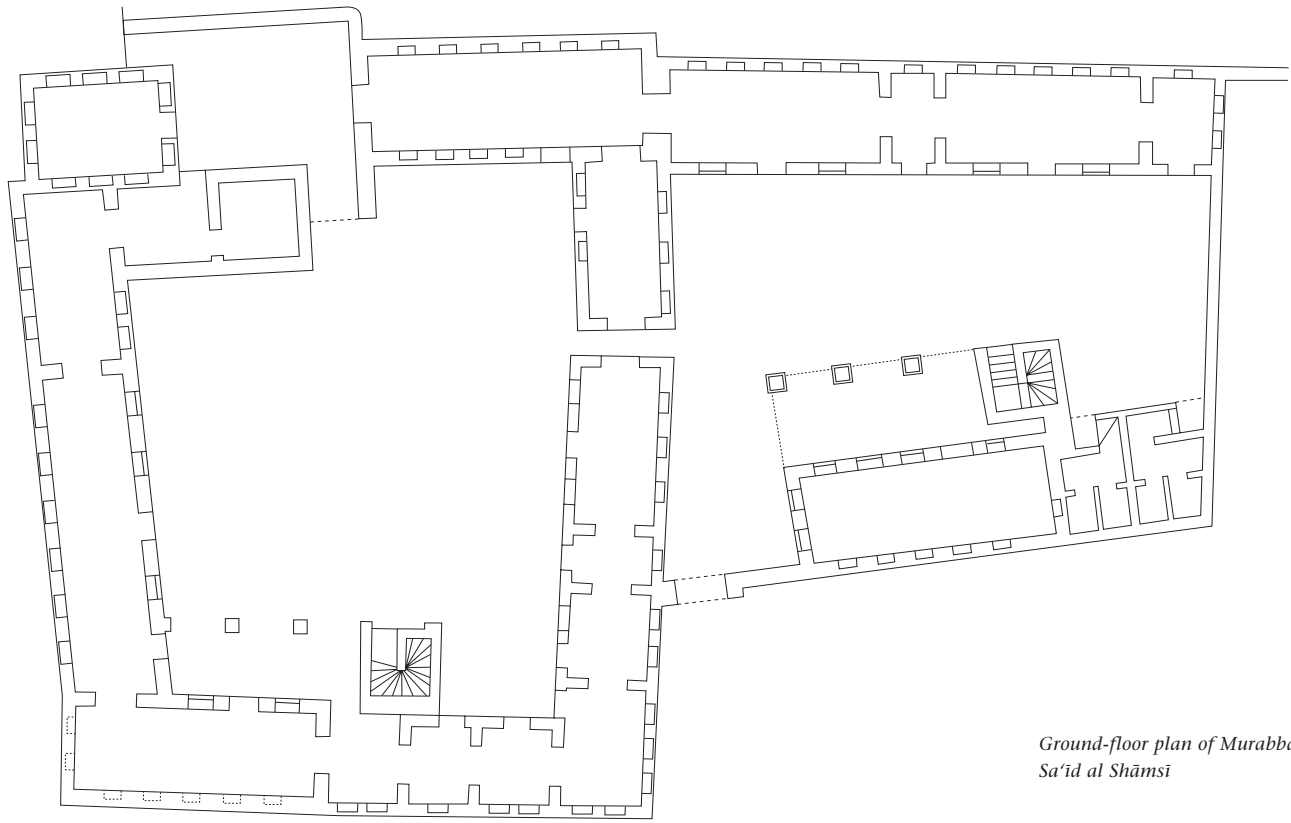
	Ground floor	First floor	Dimensions
Northern wall	4	4	60 x 90 cm
Southern wall	–	4	60 x 90 cm
Eastern wall	1	2	60 x 90 cm
Western wall	2	2	60 x 90 cm
Total	7	12	

The windows and the embrasures were for ventilation and for allowing in daylight. They were also for the surveillance of the grounds around the *murabba'ah*. The existence of embrasures in the upper storey, and the absence of windows in the southern wall on the ground floor, point to the defensive nature of the structure as they reinforce its security against potential attackers.

There are two staircases in the *murabba'ah*: the first is the exterior staircase at the north-eastern corner, which is incorporated into part of the wall elevation and leads to the roof of the *iwān*. Excavations during the year 1993–94 uncovered other foundations of living quarters in the house. Among these were the aforementioned remains of the foundations of square supports raising the *iwān* at the northern forefront of the *murabba'ah*, and also the remains of foundations, partitions and the steps of the exterior staircase.

The second staircase is located at the north-eastern corner of the *murabba'ah* and is built of shandal wood inserted into both side walls of the *murabba'ah* near to the corner, simulating the hypotenuse of a triangle with the walls as the sides of this triangle. There are six steps in all; the distance between them is 50 centimetres. During restoration the rotted woodwork was replaced. At the corner base of the staircase, there is a raised square platform (*dakkah*) measuring 50 x 50 centimetres, and 30 centimetres in height.

The staircase leads out to the roof of the first floor through an opening (70 x 70 centimetres). This was for the guards to climb through for watch duty on the parapet and the crenellated battlements.



Ground-floor plan of Murabba'ah Sa'id al Shāmsi

A shandal wood plank, smaller in size than the planks used for the staircase, is fixed into the *murabba'ah*'s upper parapet for holding on to while climbing up to the roof and to grasp when reaching for the first step of the staircase when climbing down.

There are many niches in the *murabba'ah*, distributed in the walls of the ground floor and the first storey as follows.

The distribution of the niches in the interior walls

	Ground floor	Dimensions	First floor	Dimensions
Northern wall	4	64 x 70 cm	4	55 x 58 cm
Southern wall	5	64 x 70 cm	4	55 x 58 cm
Eastern Wall	2	64 x 70 cm	2	55 x 58 cm
Western wall	2	64 x 70 cm	2	55 x 58 cm
Total	13	64 x 70 cm	12	

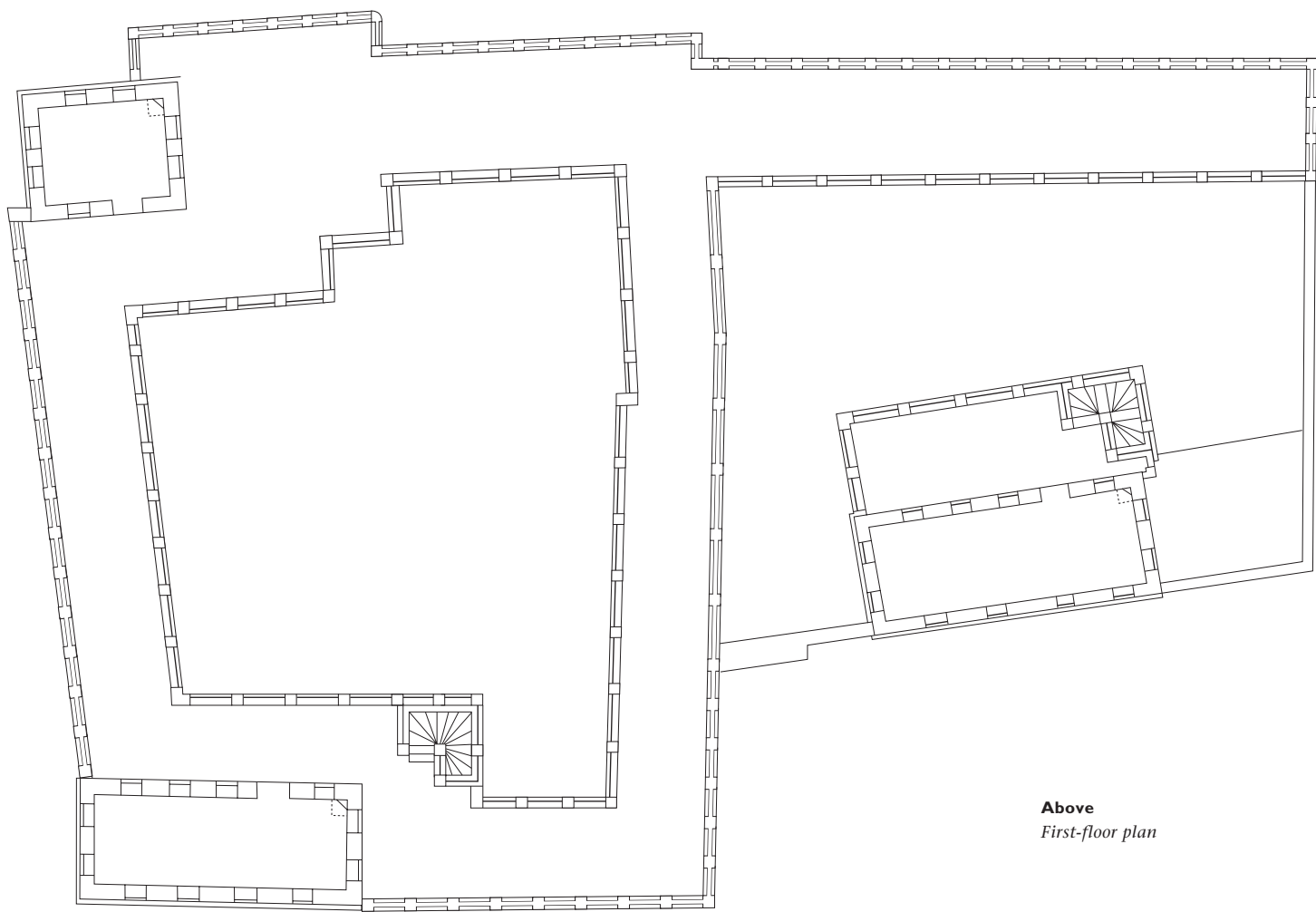
In addition many small openings exist on the first floor for ventilation and to allow in daylight when the windows are closed. They can also be used to watch the immediate area surrounding the *murabba'ah* and are distributed as follows.

The distribution of the embrasures in the walls of the murabba'ah

	Number	Dimensions
Northern wall	5	30 x 40 cm
Southern wall	4	"
Eastern wall	2	"
Western wall	2	"
Total	13	

The embrasures were made when the wall was being constructed. A small opening was left in the wall and topped with a wooden lintel. The building of the wall was then continued up to the roof and the mounting of the shandal wood.

In restoring the embrasures, the horizontal level around the walls of the *murabba'ah* is adjusted in one line. The rotted wooden lintels were replaced with new woodwork treated against woodworm and other pests such as white ants. More often than not, the method of injecting lime is used wherever cavities appear within the embrasures. The liquid gypsum seeps inside to



Above
First-floor plan

strengthen the wall and fill up the cavities. A bonding method known as ‘tying’ or ‘sewing’ is also used to treat cracks which appear at the top of the wall between the openings, and to strengthen the upper parts of the walls to support the load of the first-floor roof.

During the process of plastering the four walls with gypsum, irregularities and imprecisions were noted in the vertical level of the surface of the front elevation. This was resolved by cladding with small stones. After leveling out the walls they were coated, padded and plastered with a crude layer of gypsum applied by hand.

A *murabba‘ah* often includes circular loopholes, as found in the *murabba‘ah* of al Shāmsī. Rectangular openings may also be seen in the upper (crenellated) parapet, but these form partitions between the crenellations rather than the vertical arrow slits.

The distribution of circular loopholes in the walls of the first floor of the murabba'ah

	Number	Dimensions
Northern wall	5	Loopholes
Southern wall	3	5 cm diameter from the interior
Eastern wall	3	and 8 cm from the exterior
Western wall	1	
Total	12	

Restoration of the circular loopholes required attention to the sides and using the same methods mentioned above (bonding, injecting and plastering), depending on the condition of each loophole. Gauging the inclination and retaining the slanting level required an amount of precision in order to preserve the wide

range of vision that the openings provided. Thus the diameter of the wall opening is narrow and becomes wider towards the exterior, while the degree of inclination allowed for commanding a view of the approaches to the *murabba'ah*.

The ceiling and roof of the *murabba'ah*'s ground floor and first storey were repaired by first identifying the damaged and disintegrated woodwork. Repair work required the removal of layers of stone and earth and one wooden joist from each side, after adjusting the horizontal level required for mounting the joists. The removed wood was examined, and the joists which were in good condition were cleaned, treated and re-mounted. Those which were damaged were replaced with new shandal. Placing the woven palm fronds followed, then the plaited palm-leaf mats were spread out and coated with a layer of gypsum. Small stones were then laid on top, to be covered by a final layer of gypsum.

The same method was used to repair the ceiling and roof of the *murabba'ah*'s first storey. Due consideration was given to the inclination necessary to allow for rain water drainage from the upper roof of the *murabba'ah*. Openings were provided in the upper parapet for drainage gutters.

The upper crenellations of the *murabba'ah*'s parapet were dilapidated, so similar crenellations of still standing parapets elsewhere were examined to carry out repairs correctly. The crenellated parapet was then repaired and restored, the top part of the battlements being triangular with rectangular openings in between (as opposed to the aforementioned vertical loopholes), with a wide range of vision commanding a view of the grounds of the *murabba'ah*.

On the ground floor of the *murabba'ah* there were holes and the remains of partitions. It required the removal of new additions to uncover the original floor slab. This was aligned with the level of the entrance threshold and the outer *iwān* floor, before levelling the rest of the floor, laying out the gravel and a layer of the *ṣārūj juṣṣ* as a waterproofing measure.

Restoration of the floor on the first storey and the upper roof of the *murabba'ah* was carried out with the same materials used in the rest of the building and roofing.

Following the completion of restoration and maintenance of *Murabba'ah al Shāmsī* or *Sa'id al Ṭawīl* additional woodwork was used to embellish its features – the carved doors, frames, windows and steps of the interior staircase.

Power lines for lighting and air-conditioning were introduced to bring its function up to 'modern' standards.



IN SEARCH OF THE VERNACULAR

Conservation and reconstruction

Salma Samar Damluji

Reconstruction of the architectural heritage

Sharjah

The ongoing reconstruction work undertaken on the conservation of the traditional architecture of Sharjah have introduced a major overhaul to the urban fabric. The work proves more interesting when viewed not as a conservation activity *per se*, but as an endeavour to reinstate the vernacular architectural styles and revive the local building techniques in rebuilding the old quarters. In a sense, the general course of the development process has witnessed a reversal: when modern structures, built in the last two decades, are pulled down and demolished in favour of restoring the original vernacular buildings and the remnants of a disintegrating urban fabric.

Reconstruction, as an historical conservation activity, has precedent in the region. Much of Iraq's architectural heritage has been rebuilt, with considerable licence used in introducing new interpretations to the structures' decorative features and elements. Whereas some early attempts respected the architectural integrity of the buildings, for example al Khulafa' mosque in Baghdad by Makiya, there have also been exaggerated anachronisms, for example the zealous reconstruction of Babylon. There is also precedent for demolishing old traditional structures, mosques, forts and *sūqs*, and constructing the

'architectural heritage' anew: the Sultanate of Oman has had an established practice since the Nazwa *sūq* and mosque: both were pulled down and reconstructed in a contrived traditional 'style' on the original sites without conforming to the original design or building materials. There is little precedent in modern town planning, however, for a third generation urban fabric to be reconstructed, replacing a second – the by-product of an International Style modern development – in a period of less than three decades. A sense of remorse over the obliteration of the earlier fabric notwithstanding, the removal of the relatively modern constructions was hardly regrettable. The task proved fascinating, especially when contemplating that only a decade or two may have passed since demolition of the same traditional housing. In effect the local architectural culture was being restored through the demolition of this construction which had proved devoid of identity and which the vernacular building was originally pulled down to make way for.

The new fabric becomes a contemporary re-interpretation of the old in a polished and structurally sustainable form, recapturing the quality of the vernacular aesthetic, while restoring a particular local cultural

image that was attached to the original urban fabric. Undoubtedly, and irrespective of academic criticism relating to the historic sincerity of such radical conservation measures, the new vernacular has a valid and functional design ethos; and it is architecturally far more pleasing in style, and sympathetic to the environment, social life and the natural surroundings, than the 'modern' mediocrity that preceded it and continues to mushroom around it at the hands of speculators.

The restoration work has been carried out by the Directorate of Heritage and Conservation, under the auspices of the Department of Culture and Information, the Government of Sharjah. In the quarter of al Shahwiyyin four houses (al Sirkāl, now an art gallery, Bayt 'Umayr, 'Ubayd al Shāmsī and Bayt al Sari, now the Arts Café) and al Dalil mosque¹ have all been renovated. The impression of the old quarter cluster – narrow shaded streets, whitewashed façades, pedestrian

walkways, articulated openings and elaborately carved wooden doors – have all been recreated. These buildings have been rehabilitated into a series of art galleries and cultural venues, well restored and finished using the original building materials with integrated lighting, air-conditioning and upgraded furnishing. The interior spaces are cool and privately enclosed, restoring the original proportioned elements of design and scale. The exteriors are attractive.

At al Murayjah quarter in Ḥārat al Shuyūkh, the houses of Āl Nābūdāh (the Heritage Museum), Bayt Sa'īd al Shāmsī, known as al Ṭawīl (housing the Islamic Museum), Majlis Ibrāhīm al Madfa', Bayt Muḥammad bin Jāsim al Madfa' and Madrasat al Iṣlāh were also renovated. Bayt al Shaykhah Myrā was undergoing renovation on our visit in March 1998. Ḥayy al Sūq, also called the 'Araṣah Sūq, in al Murayjah was also completely renovated and is in use by local shopkeepers. These buildings are all situated in the heart of a larger



Above

Close-up of the Arts Museum, the renovated building of Bayt al Sirkāl in the al Shahwiyyin quarter, Sharjah



Above

Interior view of one of the museum's galleries



Above

A lane in the al Shahwiyyin quarter where the arts and culture compound was built during the renovation works of 1996, Sharjah

site where the excavation of foundations proceeds alongside traditional building work. In an endeavour to restore the original architecture of this old quarter, reconstruction of previously demolished housing is under way. Old foundations are being excavated to determine the layout of buildings, wall thicknesses, partition walls, the location of columns, arches, etc., accompanied by the collective memory of some of the inhabitants. These endeavours are encouraged and monitored by the Ruler of Sharjah, who takes personal interest in the reconstitution of this Emirate's previous architectural heritage, a topic which appears very high on the city planning development agenda in Sharjah as in Dubai. Instructions are frequently given by the Ruler to pull down a more recent building where he recalls there was a mosque or house in the traditional architectural style.

The *ḥuṣn*, at the entrance to the new city, on Burj Street known locally as 'Banks Boulevard', has been completely rebuilt. (When we first visited the city in 1996 the site had been levelled and only a fragment of the tower was left.) The *ḥuṣn* now stands as if it had always been there without interruption, in stunning contrast to the high-rise commercial buildings lining the concrete, aluminium and glass valley. It was reconstructed in the space of a year and a half, on the strength of 24-hour



Left

The arcade of Majlis Ibrāhīm al Madfa' (Muḥammad al Madfa')

Bottom left

Al Murayjah quarter: the restored streets and shops of the old sūq areas

Below right

Close-up of one of the shop fronts at sūq al 'Araṣah

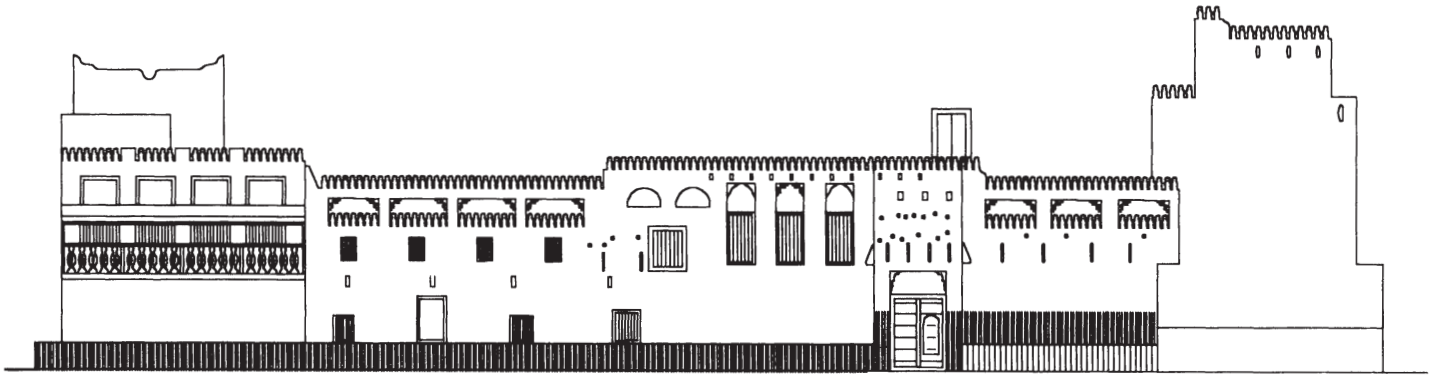
Below

The café of sūq al 'Araṣah

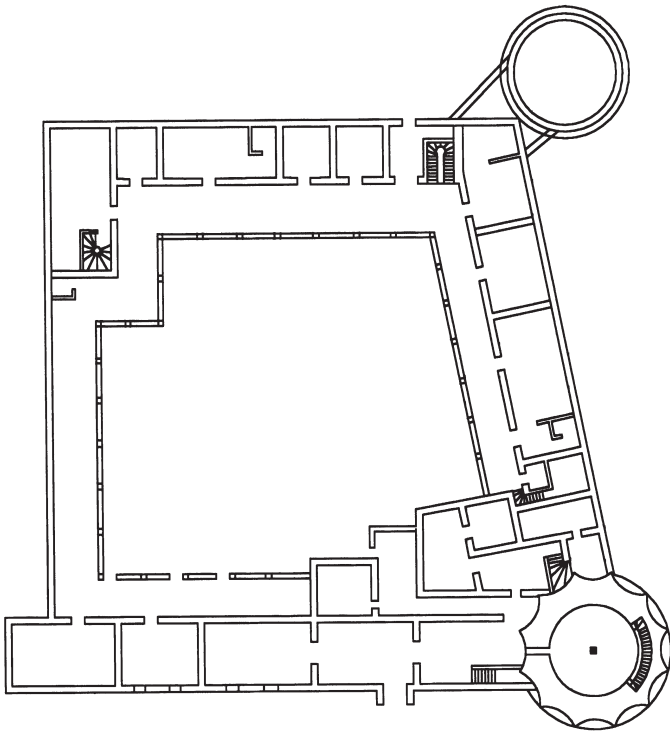


working shifts. The coral-reef stone used, originally supplied from Abū Mūsa Island according to Dr A. S. al 'Azzāwī, Iraqi archaeologist and restoration expert,² was imported from Suqatrah Island in Yemen.

The Ruler explained that the palace formed the frontier of the city in the 1940s and 1950s. In the 1960s the houses were constructed running parallel to the sea. By the 1970s the construction expanded from the previous 0.5-kilometre stretch to 1 kilometre on the seafront, when the villa construction commenced. Modern buildings, he



Above
Elevation



Above
Plans of the ground and first floors, renovated by HH Shaykh Dr Ṣulṭān bin Muḥammad al Qāsimī, 1995

explained, grew sporadically, without any coherent planning, lacking in infrastructure and with no sewerage or drainage system. He commented on the construction of new cities in the Emirates, and particularly Abu Dhabi, describing it as a concrete forest, and on the Khalifah Committee as a form of redistributing the local income of citizens.

One of the biggest problems facing the built environment in the Emirates is that of dampness and the high salt content. This has not been addressed in the development of specific qualities required in building materials for the area, reflecting on the lack of research by the building sector into the natural environmental

characteristics and requirements. In summer, the inhabitants of Sharjah would move from their urban dwellings to live in *‘arīsh* (locally known as *khiyām*, ‘tents’), houses constructed of palm fronds.

Dr al ‘Azzāwī was appointed in 1990 to implement the conservation and maintenance of heritage buildings in Sharjah, Kalbā and Dalmā. He is closely involved in the complete process, from recording the buildings and excavation through to the supervision of the building restoration. He joins the builders, stone masons and craftsmen on site, outside official working hours during the afternoons and early evenings. He began with six builders and trained them in vault and dome construction and the making and use of traditional materials. By 1996 he was working with twelve master builders. Communicating with them in their native Indian languages, his attachment to the project is of a rare quality of dedication and conviction, whether issuing directions for excavating the foundation trenches for him to assess the original structure and define the original floor plan, or instructing them on the details of the building work.

He explained that the original working plan for buildings that were renovated included three basic categories:

- Religious buildings: mosques
- Urban structures: residential; public *majālis* (plural of *majlis*); *sūqs* and shops
- Military buildings: forts, *ḥuṣūn*, *abrāj* and *murabba‘at*³

The buildings were located and defined in the overall plan of the old quarters of the cities (Kalbā, Dalmā and Sharjah) with a function allocated to each rehabilitated building in the urban fabric.

The aim of the conservation work is defined in advance in order that a clear implementation plan can be drawn for the different phases. The conservation and repair plans involve the following process:

- i. The documentation of heritage buildings by gathering information from reference sources, archives and local accounts, relying in particular on the community's elders, who lived in these quarters and witnessed the changes in the urban fabric.
- ii. Plans, sections and elevations are prepared from architectural surveys prior to commencing any works.
- iii. Photographic documentation of buildings, including detailed architectural elements, decorative work and panels, is made in order to record and preserve the original features in each building.
- iv. Frequent visits to the building and neighbouring quarter are made in order to learn more about the site, the state of the building and type of materials used, and to work out the details of the design and construction.
- v. Buildings are cleared of any rubble, additions and alterations to the original structure and design, including the closing of openings, doorways, new partitions, roof terraces, etc.

Foundation trenches are often dug to determine the characteristics of the original building. Through this process, the building materials are exposed, analysed and assessed: the type of the stone, coral reef in this case; the wood, local palm-tree trunks or the imported *shandal* or *jandal* (African or Indian) used for beams and doors; the *d'um*, palm-tree branches; and the woven *khūṣ* matting used for ceiling panels.

During the demolition process the building materials are isolated by removing each from the structure and cleaning and stripping them *in situ*. The coral-reef stones are gathered from the site, and new

stones are extracted from the seashore. The new stone requires up to three months to dry after it has been freshly extracted, and before it is cut. The larger stones are cut and dressed for use in the wall construction, and in replacing the old corroded stone. The smaller pieces are used as infill between the larger ones or for constructing the parapet walls.

Because stone was scarce, and clay for making mud bricks is not available in this area, the loadbearing walls were constructed in the traditional double skin, using an outer and inner skin with an internal infill of smaller stone and *juṣṣ*.

Lime was traditionally used for mortar between the courses, and wall and terrace floor surface rendering. Known as *juṣṣ* it was produced by burning, pounding and crushing the coral-reef stone. The courtyard floors of the house were left either covered in earth or paved in small stone pebbles. *Juṣṣ* was also used for all the stucco decorative geometric and floral patterns, executed in borders, used for the dado and relief mural panels.



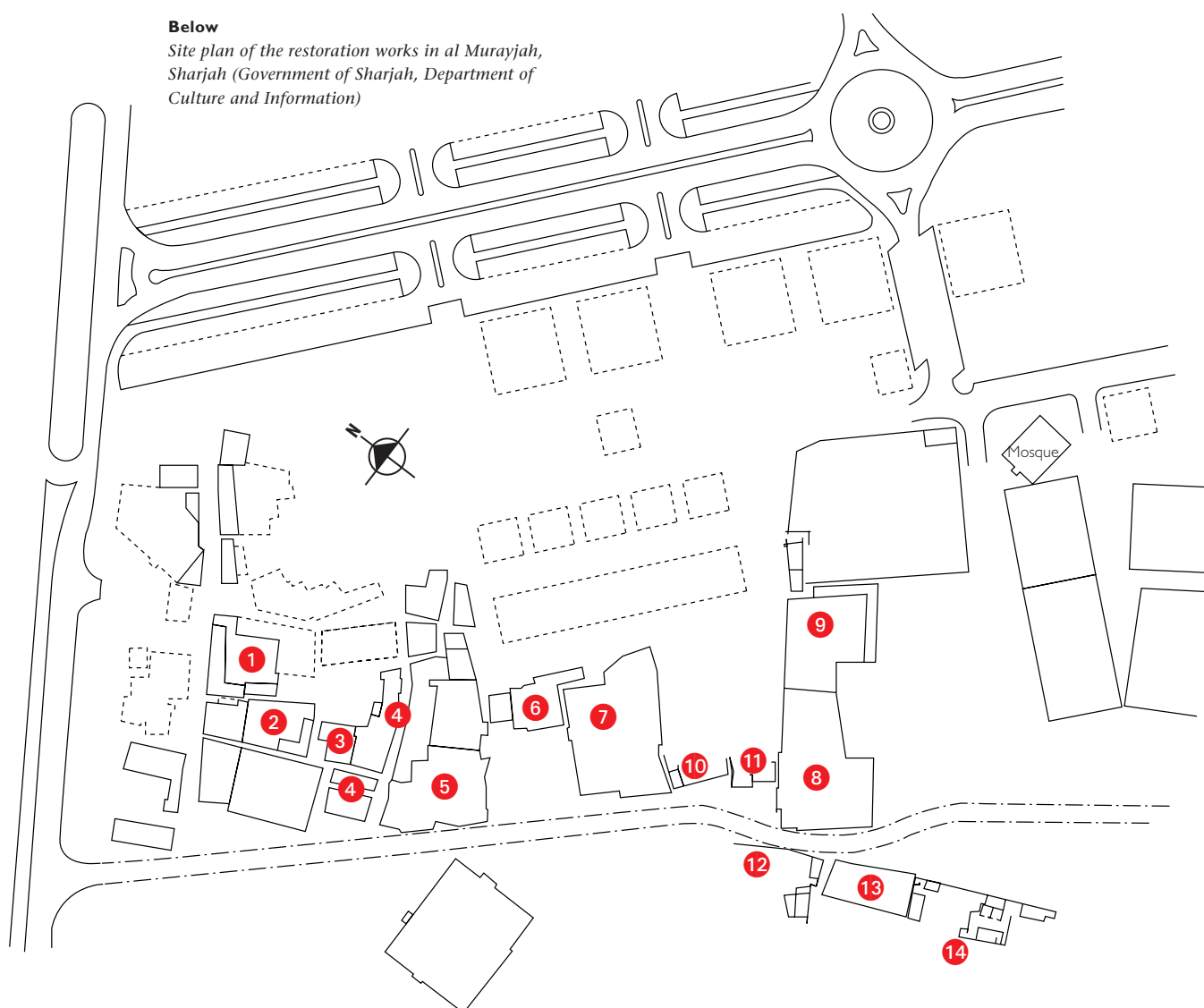
Above

Two builders dressing the coral-reef stone for the ongoing restoration of the old *sūq* in the al Murayjah quarter in 1996

Ongoing and completed works include over twenty private houses along with the squares, pedestrian walks and attached public buildings of al Murayjah, in the Ḥārāt al Shuyūkh quarter in Sharjah. The most important buildings that were included in the conservation plan were as listed on the site plan (opposite).

Below

Site plan of the restoration works in al Murayjah, Sharjah (Government of Sharjah, Department of Culture and Information)



- 1 Bayt Ḥasan al Madfa': known as al Ṭawāwīsh (work was ongoing in 1998)
- 2 Bayt Ibrāhīm al Madfa' (work was ongoing in 1998)
- 3 Majlis Ibrāhīm al Madfa': Heritage Gallery
- 4 The old Sharjah sūq
- 5 Sūq al 'Araṣah: the local sūq providing shops and a small café⁴
- 6 Majlis al Nābūdah: *majlis* for receiving guests and visitors to Sharjah
- 7 Bayt al Nābūdah: current Heritage Museum
- 8 Bayt Sa'īd al Shāmsī (al Ṭawīl): the Islamic Museum
- 9 Bayt Ḥamad al Madfa': Emirates Writers Society
- 10 Bayt 'Abdullah bin Jum'ah al Muṭawwa'
- 11 Bayt al Nūmān: used as Dār al Nadwah (seminars and meetings)
- 12 Bayt Rābwī
- 13 Bayt Sulṭān al Marī
- 14 Bayt Muḥammad bin Jāsīm al Thānī



Above
Al Murayjah quarter: path leading
to the Arts Square



Above
The Arts Square

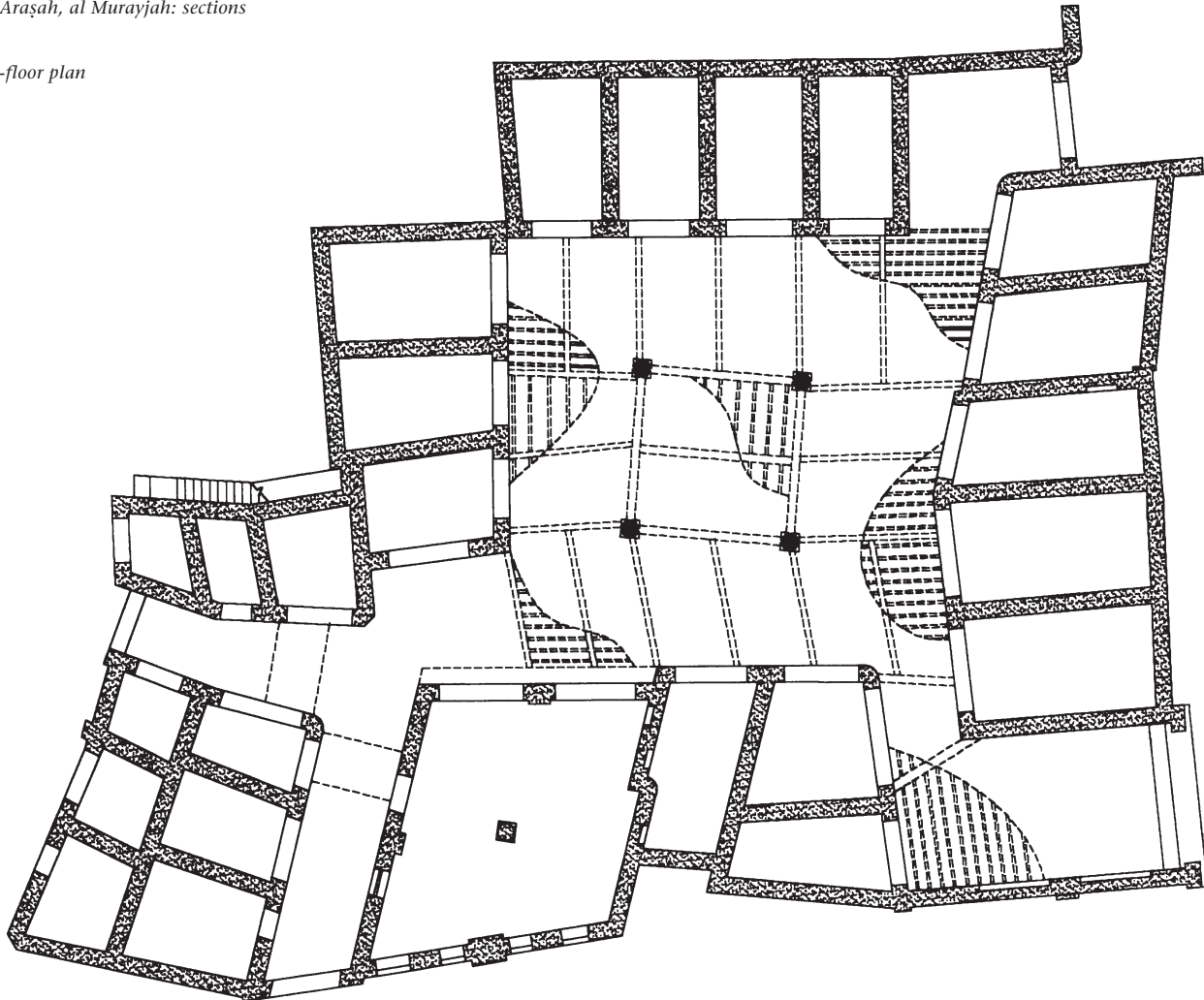


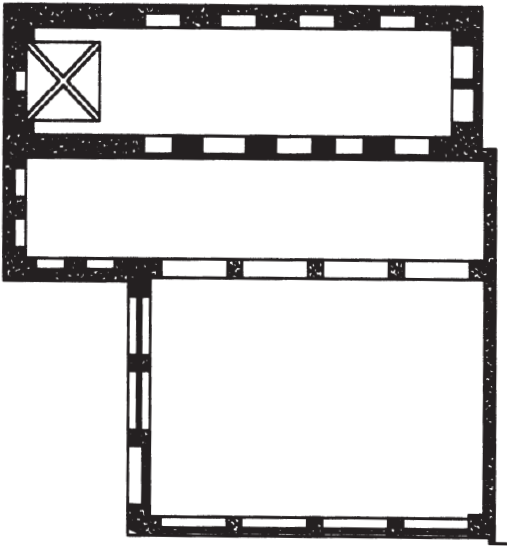
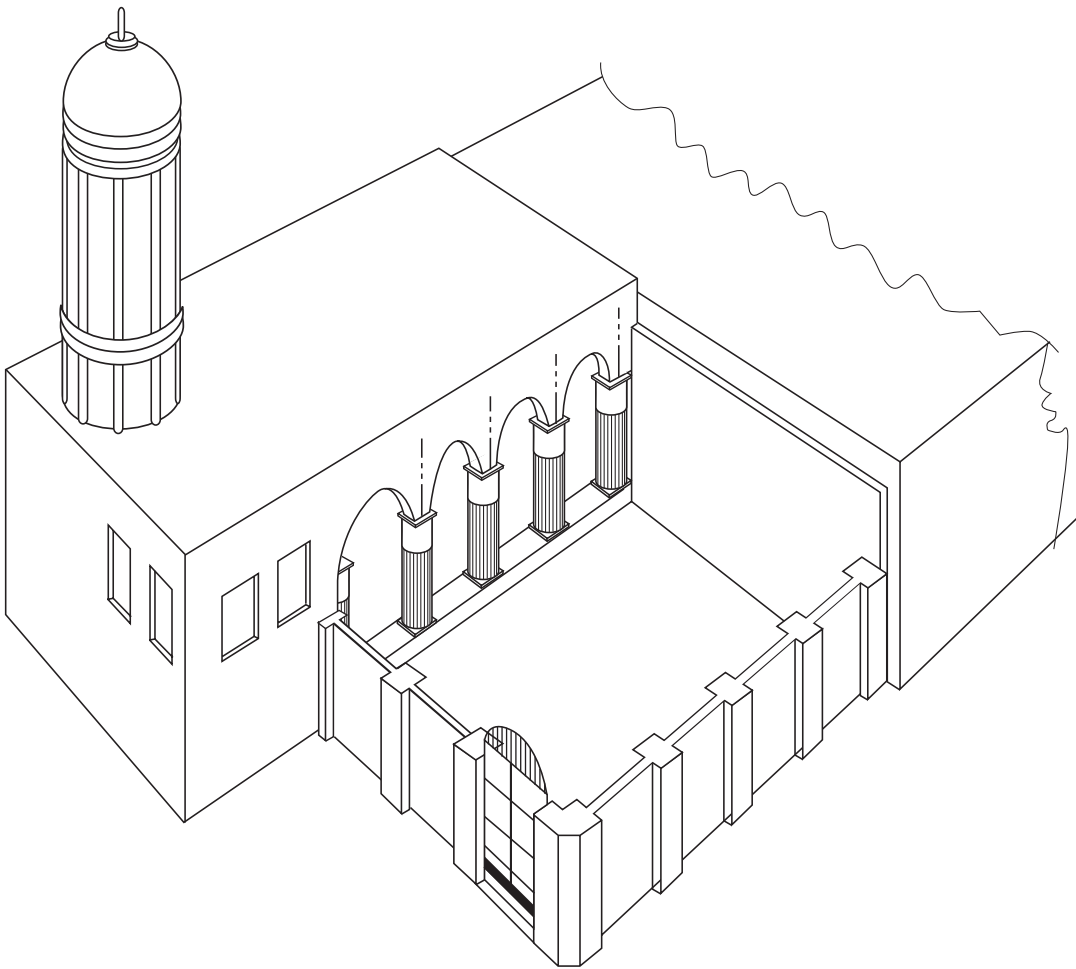
Above
Old sūq, al Murayjah: ground-floor plan



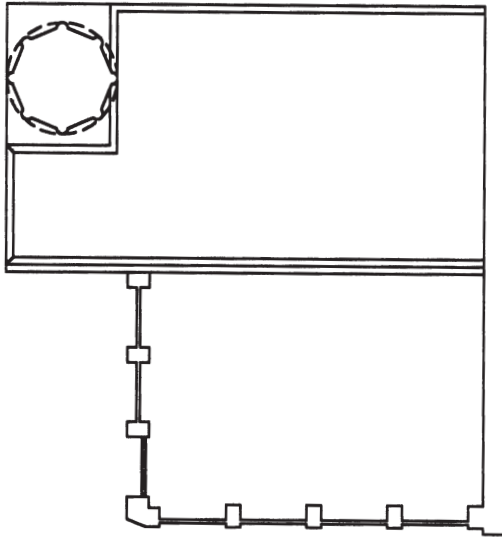
Above
Süq al 'Araşah, al Murayjah: sections

Below
Ground-floor plan



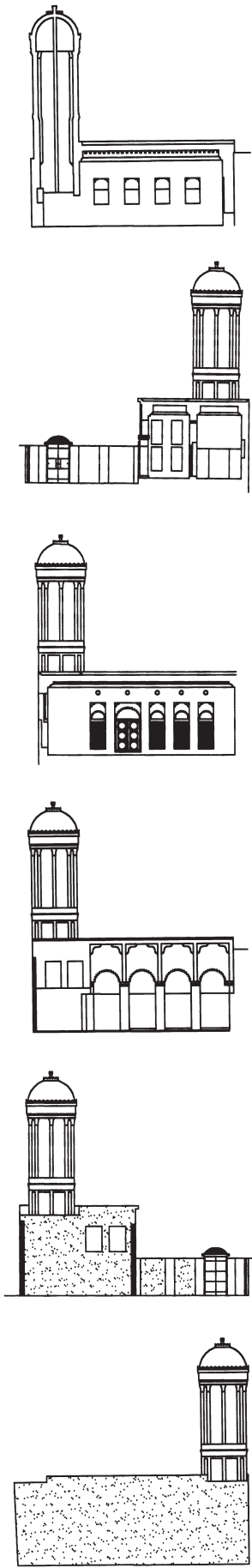


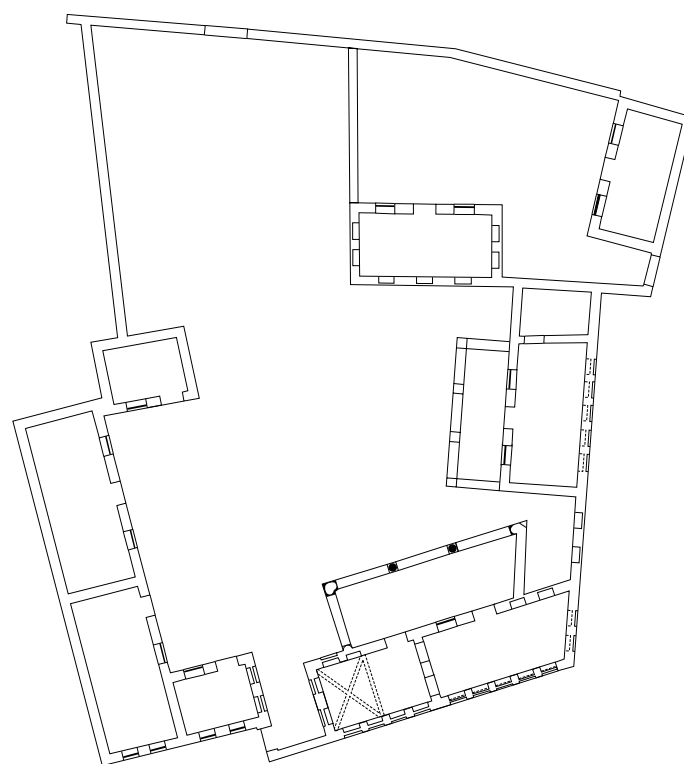
Top
*Majlis Ibrāhīm Muḥammad al
Madfa', al Murayjah*



Above
Plan

Right
Elevations and sections





Top

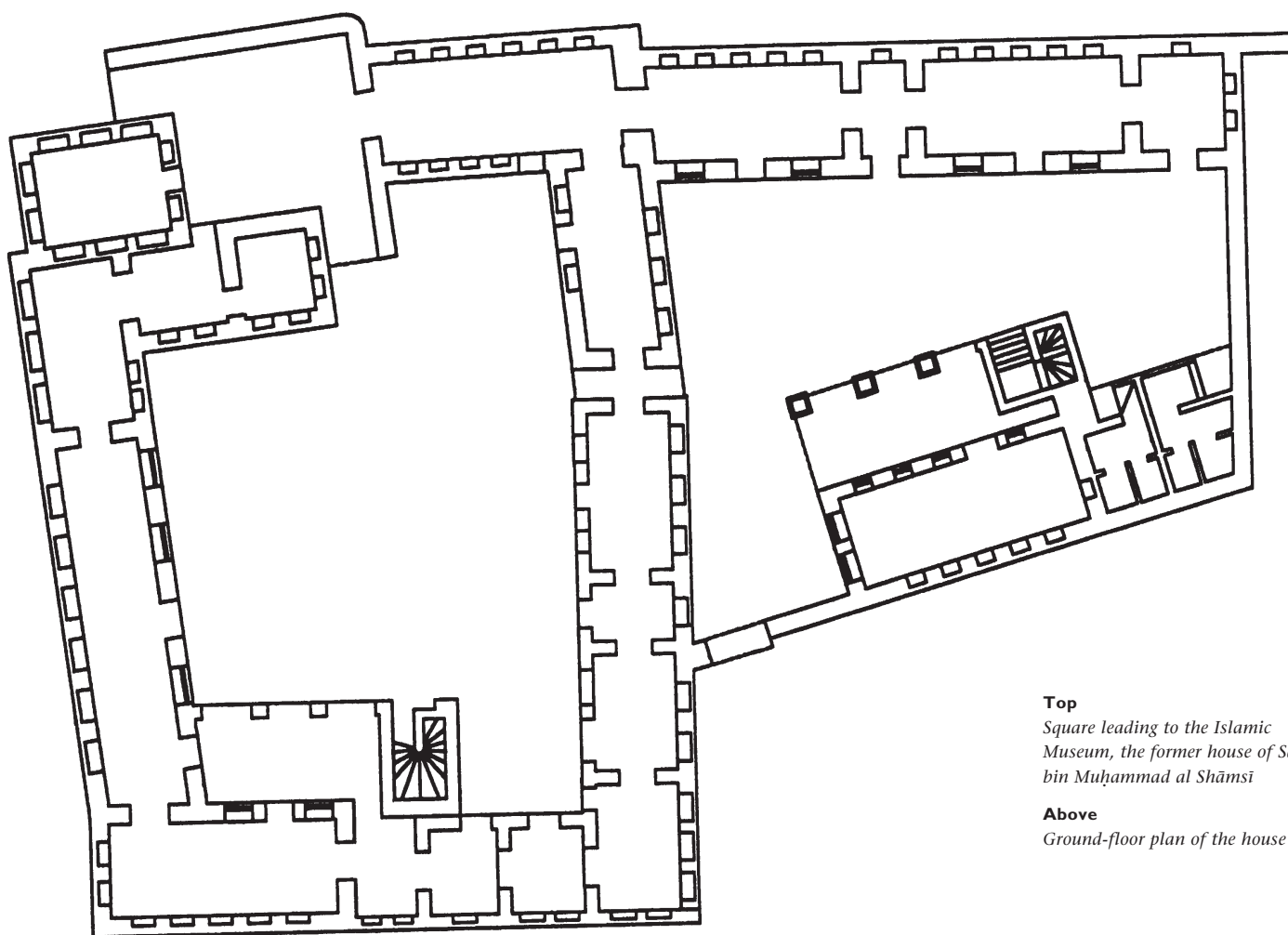
The façade of Bayt Muḥammad bin Jāsim al Madfa', located near Shaykhah Myrā's house in the al Murayjah quarter

Left

Detail of the carved gypsum fanlight screen on the first-floor reception room

Above

Ground-floor plan



Top
*Square leading to the Islamic
Museum, the former house of Sa'id
bin Muḥammad al Shāmsī*

Above
Ground-floor plan of the house



Top left

The house of Shaykhah Myrā across the square in al Murayjah, which was renovated in April 1998. In the background towers a recently built commercial building and between the two is a row of modern villas that incorporate non-functioning windtowers which complement the traditional vernacular

Above

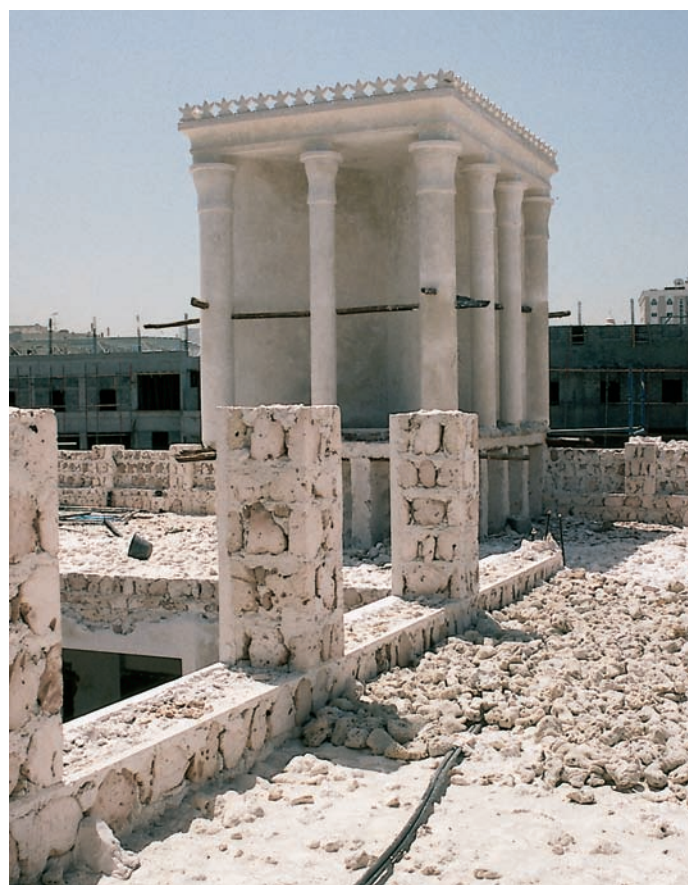
Shaykhah Myrā's house: close-up of a reconstructed ceiling, showing the layers of shandal purlins with date palm-frond stalks (jarid) used as rafters and sewn together with palm fibre strings

Top right

Detail of the wall ventilation openings and recesses supported by lintels using shandal wood wrapped with coconut palm tree fibres (nārjīl)

Right

The roof during the construction of the parapet wall, with the original windcatcher at the back

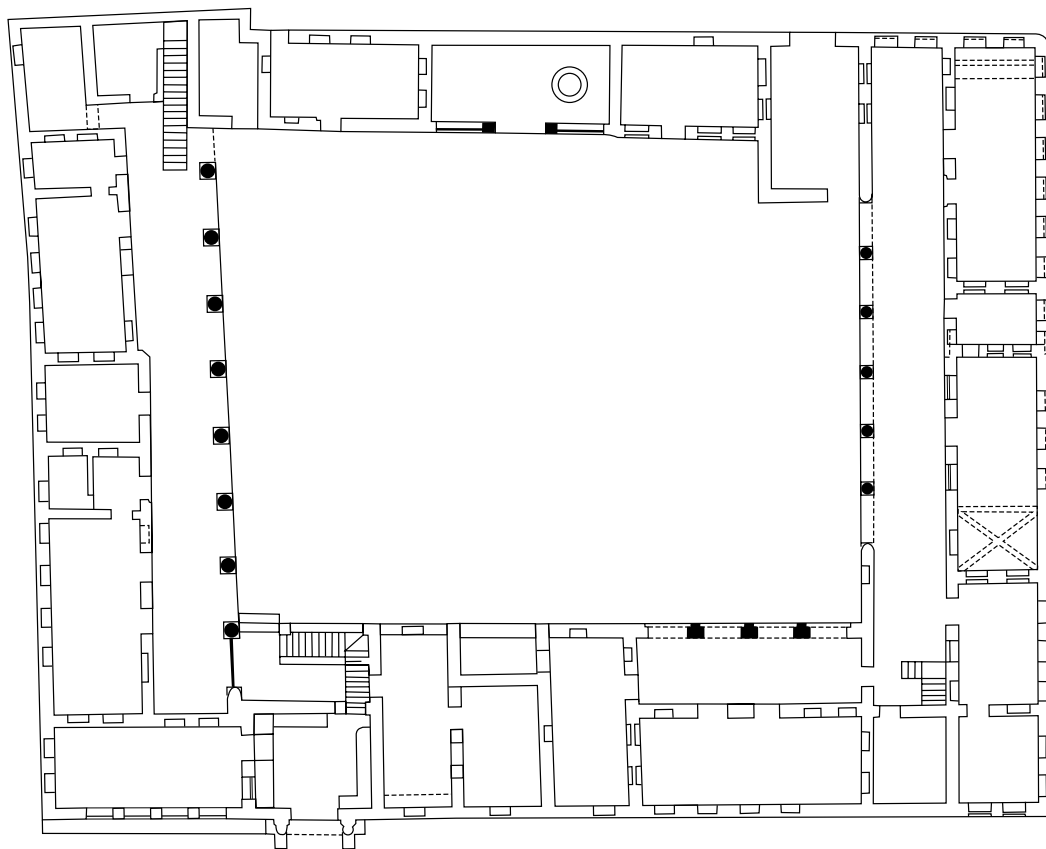


**Above**

Shaykhah Myrā's house: detail of wall prior to being rendered showing the coral reef stone coursing with juṣṣ (lime plaster), with the ceiling composition of shandal purlins and jārīd.

Right

Ground-floor plan



The two most impressive houses, as can be seen from the plans, are Bayt al Sirkāl and Bayt al Nābūdah. The work on the latter house commenced in 1990 and was completed a year and a half later. The general plan is ideally illustrated by the Nābūdah house, which has a typical L-shaped entrance (known as a *raddah*) to the north-west, opening on to a central courtyard (*fanā'* or *ḥiwī*) which is surrounded by a total of eleven living and private family rooms. The latter, situated on the north-west and north-east of the house, are separated from the *fanā'* by an arcaded terrace which is raised above the floor level by three steps. A circular spiral staircase, three in the case of this house, around a central column, leads to the first floor where an additional six rooms are located on the north-west and north-east section of the house, with attached roof terraces. The rooms have a uniform width of 2 metres, the larger being between 4.5–5.5 metres in length. Most of the large rooms are beautifully decorated internally with white bands of relief *juṣṣ* patterns, blind arches along the length of the wall and elegant niches. There are two small rooms measuring 2 x 3.5 metres and

**Above**

Bayt al Nābūdah: view from the arcade of the eastern wing looking towards the older single-storey south-west wing

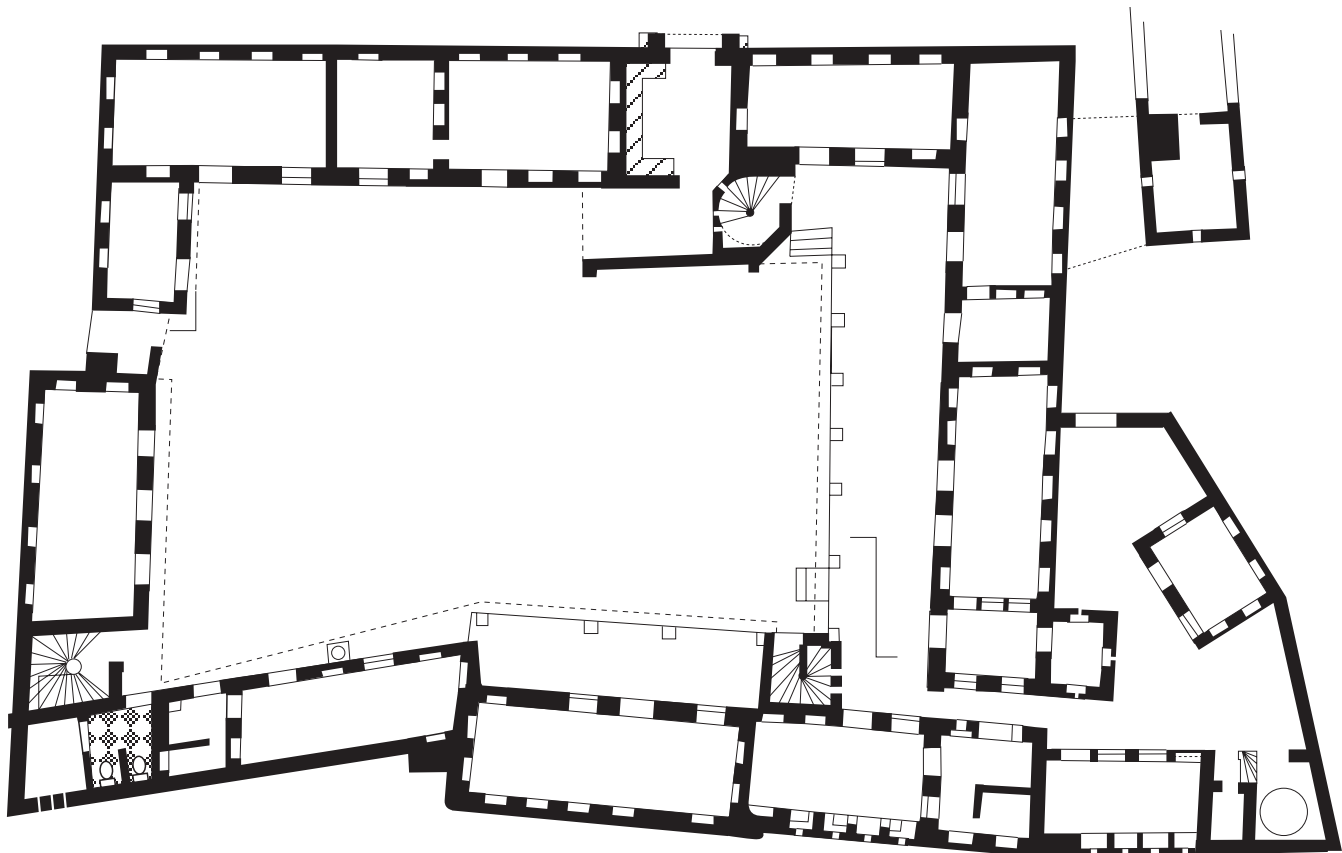
the storage spaces are 1.5 x 1.5 metres. The windows and doors are in carved wood which is also rich in floral decorative mortifs. The impressive main entrance door, known as the *dirwāzah*, was only opened in full for festive occasions and receptions. At other times the smaller door opening within the larger frame, known as the *farkbah*, was used.



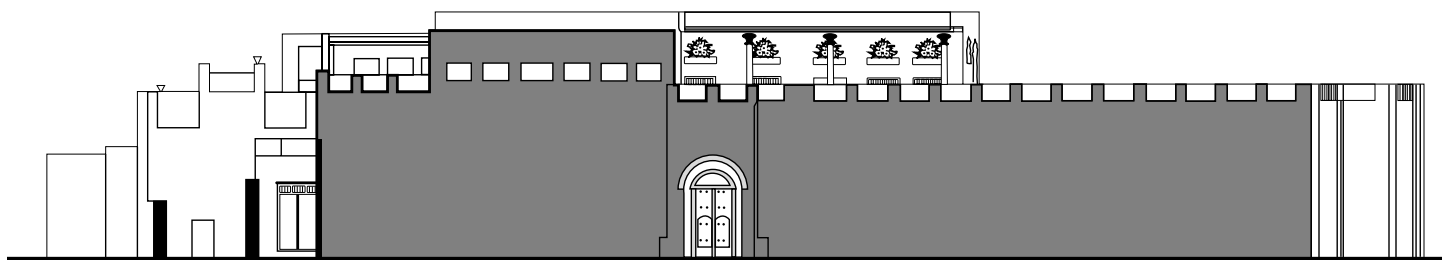
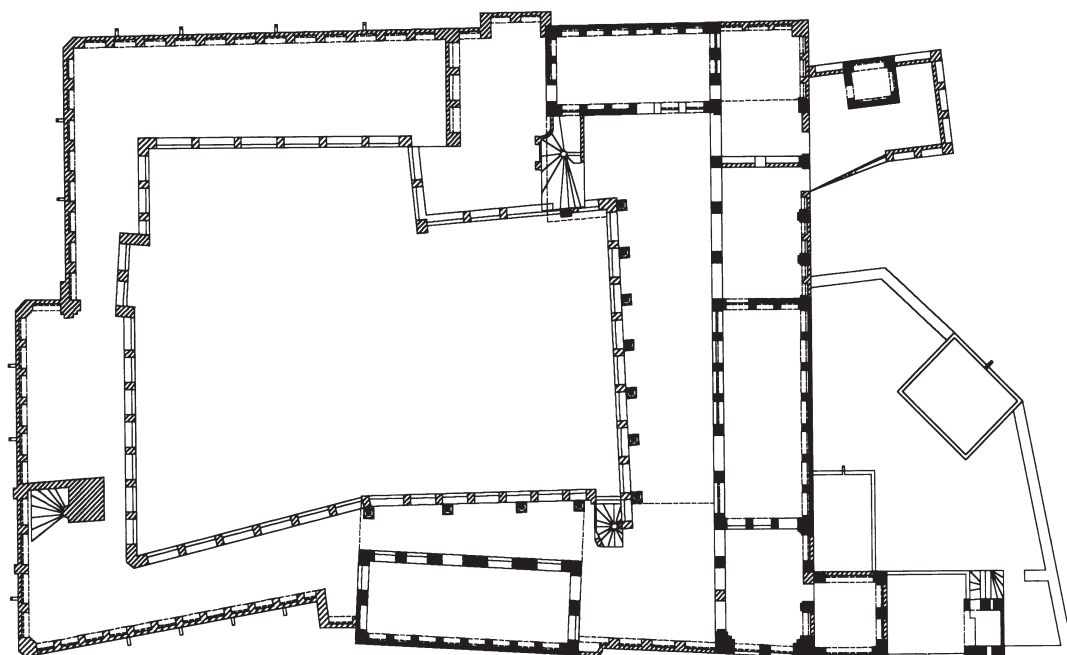
Above
Bayt al Nābūdāh: view from the courtyard onto the north-east wing



Above
View of the north-west and south-west wings



Above
Ground-floor plan

**Top left**

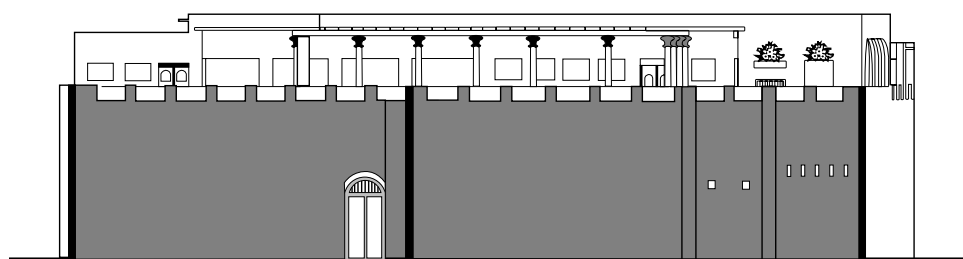
Bayt al Nābūdah: ceiling detail showing the beams of shandal wood wrapped with rope from coconut palm trees known as nārjīl with juṣṣ (plaster) infill

Top right

First-floor plan

Right and above

Elevations

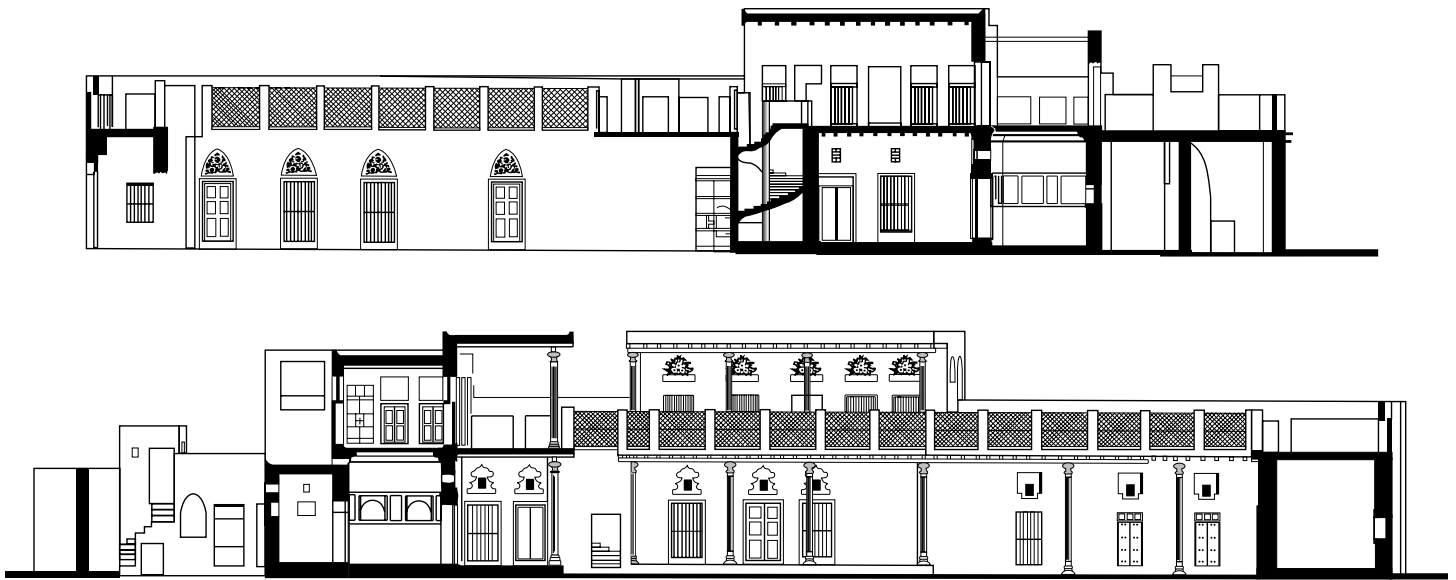


The kitchen facilities, bathrooms and stores are located around a patio directly behind the main private spaces of the houses (to the north-east) with a separate 'back door' to the street to the north-west. According to Anderson up to fifty family members lived in the house; the older part of the house, situated along the west of the *fanā'*, south of the main entrance, was constructed between 1905 and 1910, the north-west wing was built between 1910 and 1920, and the eastern wing of the house was built at a later date.⁵

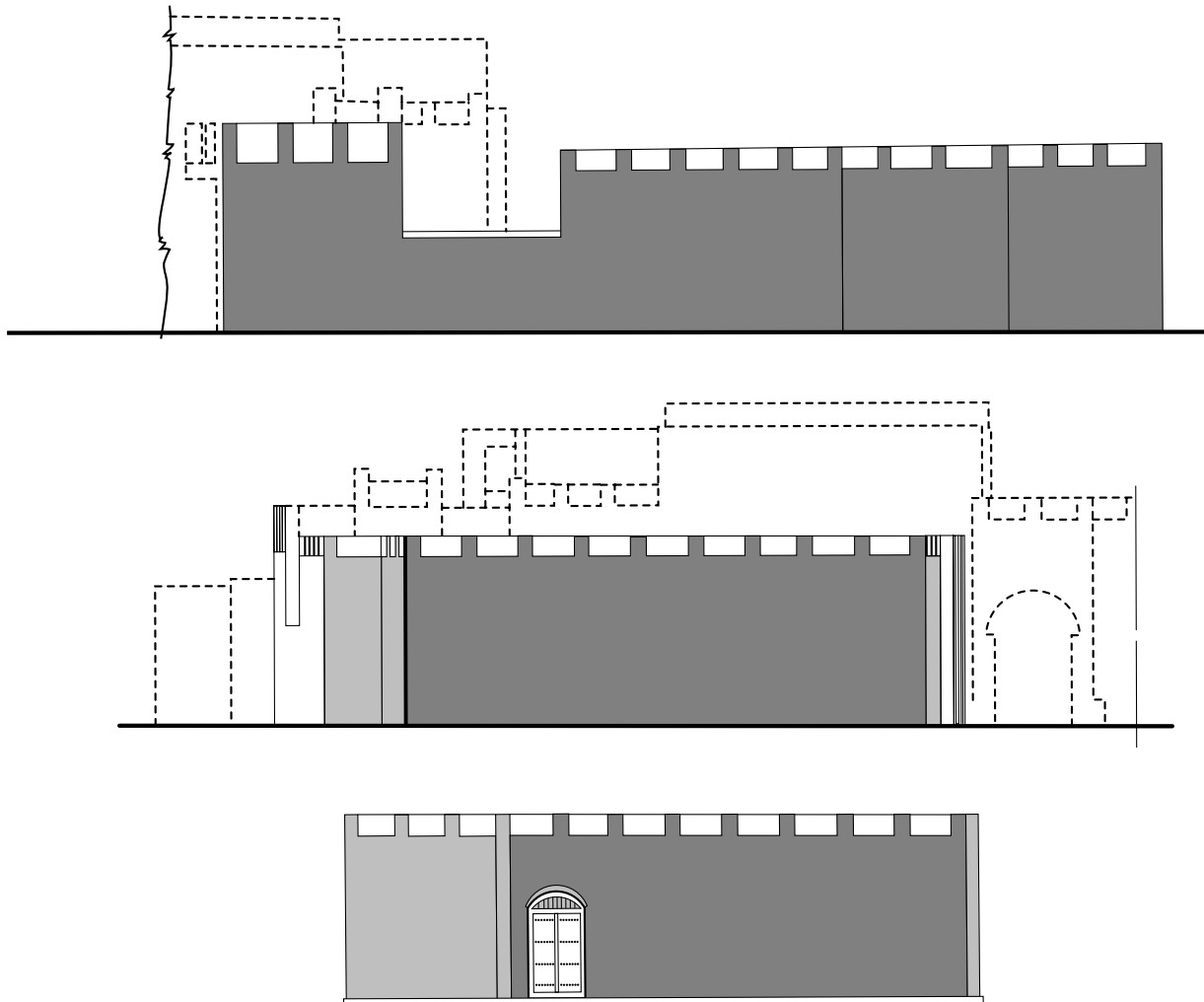
To the north of the main house is Majlis al Nābūdah, a modest house in comparison to the first, set

aside for receiving visitors and accommodating guests. It was essentially for holding meetings and provided a space for temporary stays, or as a waiting area for visitors before being received in the main house. It contains three rooms around a central courtyard, an *iwān*, storage spaces and a bathroom.

The old fort and palace of Ḥuṣn al Shārjah, completely reconstructed, has become the city's History Museum, with an emphasis on illustrating the traditional architectural details manifest in the building's structure. A photograph of the building prior to its demolition in 1970⁶ shows the considerable alteration in



Above
Bayt al Nābūdāh: sections through the courtyard showing the house's interior façades

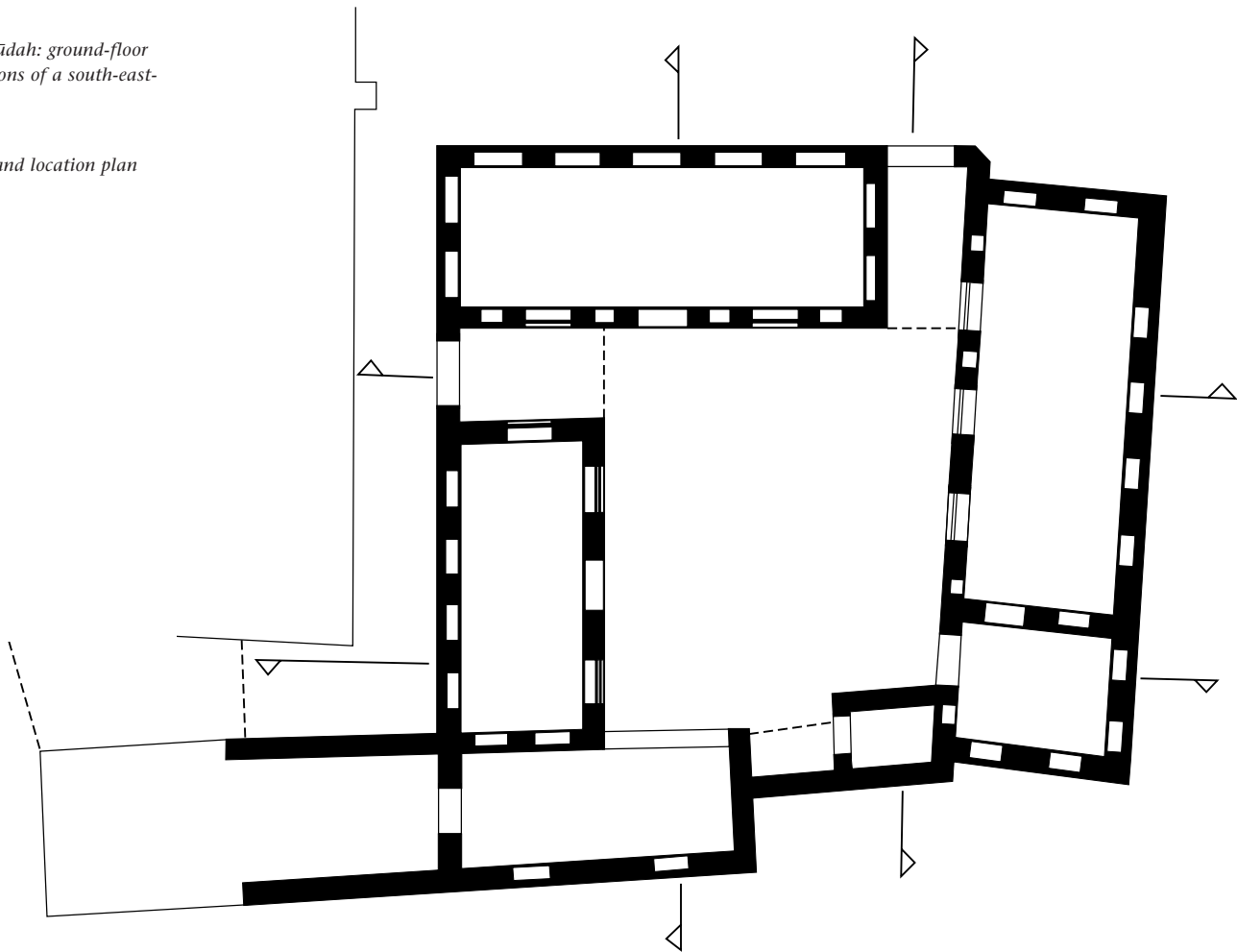


Above
Majlis al Nābūdāh: elevations



Above
Majlis al Nābūdah: ground-floor plan and sections of a south-east-facing room

Right
Ground-floor and location plan



the current reconstruction of the original façade of the building. The plan of the Ḥuṣn was revised by the Ruler HH Shaykh Dr Sulṭān bin Muḥammad al Qāsimī, in order to assist in the reconstruction of the palace.

The same conservation and repair techniques were implemented in the treatment of the foundations,



Top
The grounds of the Ḥuṣn Palace prior to reconstruction, April 1996. The only existing part of the original structure is the north-east tower of the current building

Above
Detail of the old restored tower looking east

Top right
Close-up of the roof parapet opening on the east wall

Right
View from the interior of the old Ḥuṣn Palace looking across the central courtyard towards the north-west corner of the structure where the square tower (mushrif) is situated





Above

Main south-facing façade of the reconstructed Hushn Palace, now surrounded by the towering commercial buildings along the main business avenue of the city, Burj Street. To the right is the tower known as the mhalwasah

walls, openings, decorative details and ceilings on all these buildings.

Foundations are reinforced after assessing the wall thrust and loadbearing properties, with internal supports (square or rectangular supports placed at intervals along the trench) and additional buttressing at the weak points. These are built, using stone, by expanding the existing foundation trenches in depth and width, up to 50 centimetres and 20 centimetres respectively, and effectively building wall supports along either side of the foundation base.

After cleaning and stripping the walls and identifying the weak structural points, repairs are commenced. Cracks are treated by reinforcing those sections with horizontal wall ties, a process known as *khyāt* (sewing). Wall sections that are decayed or collapsed are reconstructed. Cavities on the face of the rough stone and between the courses are injected with a lime infill to reinforce the structure. Similarly, lime is poured and injected in the lining of the double-skin wall cavity to strengthen the structure of loadbearing walls. *Juṣṣ* is used as a finishing coating on the interior and exterior walls, and for the surface

treatment as well as for rendering the jointing of courses (pointing or *takhīl*) on the façades. Apart from being aesthetically appealing this serves as a damp-proof course with favourable cooling properties.

Doors, windows, niches and slit ventilation openings are identified in the exterior and interior walls of the building, according to their form, size and location in order to be replaced.

Columns are constructed as pillars or pilasters. These are also built in stone, and located in the *irwān* (*irwān*) opening on the courtyard, or on terraces preceeding first-floor rooms. The circular pillars have a wooden base and capital.

Decorative geometric and floral patterns are executed in *juṣṣ* and gypsum, and applied in borders and dado running on the façades and wall exteriors, below the ceilings on the interior walls and surrounding openings. Carved screens in the same patterns are also used to cover openings, and wooden moulds are made for these.

The *shandal* ceiling beams are replaced with new ones and treated against decay caused by white ants. The ends of the beams that rest on the walls are treated with tar, or covered in plastic sheeting. The *du'ūn* is placed above the beams – these are scraped palm-frond stalks

(*jarīd*), fitted together and sewn with palm fibre strings. Above this the *kbūṣ* matting (woven palm fronds) is replaced if necessary.

After considering the inclination level required for the rain water drainage, roof floors are covered with a coating of *juṣṣ* and small stones.

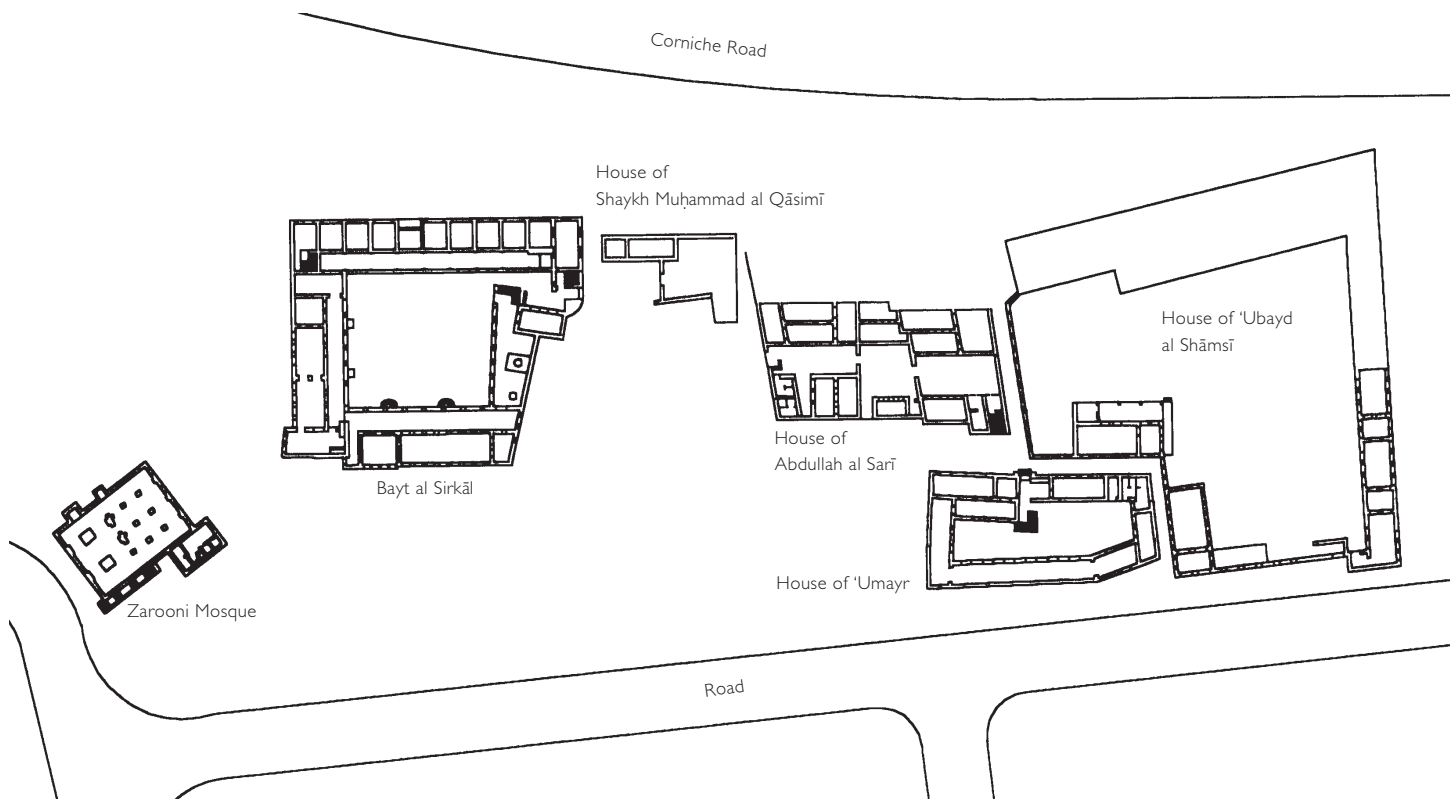
Exterior roof parapets are constructed: these typically functioned as ventilation screens as in Bayt al Nābūdāh. More commonly, though, the roof parapets are built with 40 x 40 cm square pillars with wooden *masbrabiyyah*-type screens fitted across. The same low parapets are used as partitions between the arcades and the interior courtyard (*fanā'*) on the ground floor of houses.

Many of these houses possessed a *barjīl*, a wind-catcher with four openings. These are maintained by replacing the internal wooden strut structure, or they are rebuilt completely if they are partially damaged.

Al Shahwiyyin area

- Masjid al Dalīl (used for daily prayers)
- Bayt al Sirkāl: Technical Training Centre
- Bayt 'Umayr: Fine Arts Society
- Bayt al Sari: Fine Arts Society and Arts Café
- Bayt 'Ubayd al Shāmsī Building
- Bayt al Shaykh: Arts Library

The same work plan implemented at al Murayjah quarter was employed in these buildings. The community has responded favourably to the rehabilitation of the buildings, and is very much at home with the new environment, especially that of the *sūq* where daily social and economic interaction is evident. The shopkeepers of the *sūq* are the grandsons of the previous owners and are proud of having been able to return. They brag about whose grandfather must have been better off, according to the size of shop they have inherited.



Above
Part of the al Shahwiyyin quarter site plan, 1995 (al Shahwiyyin restoration works, Government of Sharjah, Department of Culture and Information)

Traditional master builders of Sharjah

In April 1996 a meeting was held with three traditional master builders in al Shārjah, who are all now retired – ‘Abdullah bin Abdul Raḥmān al Jarwān, Sayf bin Sa‘īd al Jarwān and Ibrāhīm Faraj Muḥammad. The term *bannāy*, builder, was used even for the master. The terminology



Top
Close-up of the imported coral-reef rock used in the reconstruction of Sharjah's vernacular architecture

Above
Close-up showing a newly constructed wall with the outer and inner skin and an infill of stone and poured juṣṣ

related to architectural elements and building details is very similar to that of neighbouring Oman.⁷ *Drāyish* is used for window openings and niches, *dirwāzah* for the main door or gate, *ṭawī* for the water well, *ṣalḥah* for wall rendering with the *juṣṣ* (gypsum plaster) and *sinṭwānah* for the column. Other terms, and those related to measure, are common to Arabia in general: *sās* for the foundation, *qāmah* for measuring room height, and *dhirā'*, the length of the forearm (equal to one and a half feet), for measuring lengths. Variation occurs in specific terms, for example *makhzan* is used for the family living room as well as any ordinary room. The term *majlis* is only applicable to the men's reception areas, also known as *dīwāniyyah*. The *ṣābāt* are the spaces that open on the courtyard, *ḥawsh*, and are used for the *iwān* (or Persian *līwān*). The term *ḥawī* is also used for the *ḥawsh*. Another term they use, equivalent to the *qāmah*, is *bā'*, which is the span of the outstretched arms.



Above
A store of woven palm-frond mats (khūs), which are placed over ceiling panels made from the palm stalks (jarīd) stacked on the left



Top left

A master craftsman laying the jarid stalks to cover the roof of the reconstructed suq in the al Murayjah quarter, 1996. The jarid is first put in place (see right of picture) and is then tied together in situ (see left of picture)

Left

The khūṣ woven mats spread over the jarid ceiling layer

Top middle

A view of a house interior undergoing reconstruction, the wall containing niches with recessed ventilation slits and for storage

Top right

Juṣṣ-making in the courtyard of a building undergoing renovation. The limestone is burnt and then broken down, pounded to a fine powder and then mixed to a paste with water

According to the builders, the foundations were traditionally dug to two or three *dbirā'* below ground level, depending on the proximity of the site to the sea. The wall thickness was one-and-a-half to two *dbirā'* and maintained this width on the first floor, so the buildings do not taper. Room heights were up to two-and-a-half *qāmab*. The stone loadbearing walls were reinforced with wooden tie rods, spaced regularly at every three or four courses. This technique, according to the builders, would make the walls last for up to a hundred years. The wood, imported *shandal*, is completely bound with 'rope' made from coconut palm (*nārjīl*) fibre and known as *ḥibāl kumbār*. Plastered in *juṣṣ*, the same wood is used to support the spiral staircase and as lintels to span the offset horizontal slit-wall openings used for ventilation.

The inhabitants lived on the ground floor in winter and moved to the first floor in summer. The first-floor rooms had several window openings, built-in wall ventilation openings in horizontal gaps and the *barjil*, all providing air movement and a cool breeze on the interiors. The slit wall and *barjil* shaft openings would be closed off in winter. The houses of ordinary inhabitants would have two to three rooms, on one floor only. The merchants and Shuyūkh built grand houses of 10 to 15 rooms on two storeys.

The builders told me that there were many of those traditional houses in 'this country', *bilād*, but they were all pulled down. When I asked how many, they said the whole of Sharjah, all of it was built like this and now nothing remains. When I asked about the rebuilding, they commented that whatever was now being built will never look like the original: '*al awwal awal mā yirja*' ('the original was of the past, it cannot be returned'). They said that the construction techniques differed now: the walls are being built in double skin with an infill of stone chip and plaster, of which they disapproved. Previously, they told me, the wall was built in a single skin of rubble work using the natural rough large coral-reef stones.

Dubai

The two most important quarters, as far as the architectural heritage of Dubai is concerned, were the housing of al Bastakiyyah and al Shandaghah. The architecture of the Shandaghah quarter was totally obliterated four or five years ago. The al Bastakiyyah quarter, currently containing the largest number of traditional buildings in one area,⁸ including the renovated Palace of the Ruler,⁹ is now subject to a renovation and architectural rehabilitation scheme to include fifty houses. A committee for the preservation of the architectural heritage was formed in 1995, affiliated to the Historic Buildings Department¹⁰ of Dubai Municipality. Several successful conservation projects were carried out by this department including the work on Madrasat al Aḥmadiyyah.

The question of Dubai's conservation, especially concerning the area of al Shandaghah, which was described as having been the heart of the old city, remains a complex issue. It is intended that of the demolished quarter's buildings 140 houses are to be reconstructed after new drawings that were prepared by the Municipality, since no surveys were conducted prior to the demolition of the quarter. However, recent tourism and 'folklore'-oriented buildings constructed on the site (a heritage village at Khawr Dubai in the vicinity of the Shaykh Sa'īd bin Maktūm house) indicate a short-term commercial prospect rather than a serious attempt at replacing the razed fabric of al Shandaghah quarter. The reconstruction of the traditional residential fabric of this quarter also seems to present a cultural

enigma, with the local inhabitants attributing its now lost architectural heritage of windtower houses to the Persian merchant community of Dubai.

Dubai Municipality has placed equal importance on the documentation of the architectural heritage as on the process of the city's modern town planning. This is apparent in the ongoing exhibition at the Municipality, where documentation and evaluation can be seen, accompanied by a comprehensive presentation by the Historic Buildings Department, illustrating the numerous completed projects of restoration and renovation of several vernacular buildings and sites. The visual material (architectural drawings and photographs) is accompanied by the documentation and application of traditional elements and concepts in architectural design. This newly established department carries out studies and researches into the traditional architecture, through surveys and documentation, for the purpose of developing the use of those elements in modern architectural design and planning. The department is also responsible for preparing a publication programme on heritage issues, aimed at increasing public awareness.

The department's research highlights the importance of the study of the architectural history of Dubai; the effects of the post-1960s development are considered along with the relationship of the two urban fabrics and the solutions that may be recommended in terms of materials, function and climatic responses of architecture and planning.

Conservation: Dubai municipality

The Historic Buildings Department earmarked the principal remaining traditional areas for conservation. The programme included the following: al Rās (including Madrasat al Aḥmadiyyah, Bayt al Turāth and Masjid Lūtah); al Sūq al Kabīr in Dubai, al Sūq al Kabīr in al Dayrah, al Bastakiyyah, al Shandaghah and the

rehabilitation of the creek façades on Khawr Dubai. Separate buildings included Ḥuṣn al Fahīdī, Bayt al Shaykh Sa'īd bin Maktūm, Bayt al Wakil and Majlis al Ghurayfah. A documentation was carried out of the buildings and main residential conservation areas that included the buildings restored between 1991 and 1995

with architectural surveys, plans, elevations and drawings of decorative details.¹¹ The projects reviewed below are selective and contribute in context to presenting some unique examples of the architectural heritage of Dubai.¹²

The house of Shaykh Sa'id bin Maktūm

The rehabilitation of Bayt al Shaykh Sa'id bin Maktūm was completed in 1986 by Makiya Associates. The structural condition of the house was dilapidated. Photographs supplied by the architects with the project submission to the AKAA¹³ show the building in near dereliction, with partial collapse to various parts of the structure. The consultants proposed a complete scheme for the reconstruction, based on surveys they had conducted in 1980; the conservation works were

contracted out, since the Municipality at the time did not have the necessary expertise. The work included the conservation of the *sūr* and providing the building with modern facilities (electricity, air-conditioning, water supply and sewerage). It was completely restored to its original state and the windows and doors that were beyond repair were replaced with identical newly made versions.

The Municipality then decided to make use of this building and turned it into a museum of documents and

Below left

Aerial views of the Heritage Village and recreational resort constructed in the grounds of the Shadaghali district, close to Shaykh Sa'id bin Maktūm's house

Below right

Aerial view of Shaykh Sa'id bin Maktūm's house in the Shandaghah district of Dubai, restored by Makiya Associates, 1986

Bottom

Blind arches in the façade wall near the entrance





Top
Shaykh Sa'īd bin Maktūm's house: close-up of the arcade and first-floor rooms

Left
Interior of one of the rooms on the first floor looking out across the creek

Above
Close-up detail of one of the windtowers

photographs of traditional architecture. It was divided into nine wings, one of which exhibits the documentation of the conservation process and the state the building was in prior to the restoration. One wing is dedicated to photographs of the Āl Maktūm family, pertaining to the Shaykh Sa'īd's life, views of the old town, and his sons up to Shaykh Maktūm. Another wing covers the city of Dubai's urban history, through photographs taken by travellers, including aerial views, chronologically ordered to illustrate the urban development and planning of the town. Another wing is dedicated to life at sea which formed an essential economic base for the inhabitants of Dubai, with examples of the local ships that were used, diving devices employed in pearl diving, fishing and ship building including the provision of supplies for regular journeys. Another wing exhibits photographic views of the city post-1960s, with its buildings and lifestyles, and another is dedicated to the social life, the *sūqs* and trade activities, religious and traditional social ceremonies.

A collection of stamps and coins is exhibited showing the coins that were in use for three centuries. The upper floor has a wing on Bedouin and desert life in photographs, with another section on historical documents including old passports, commercial passes, local decrees from the Ruler, etc. Another section contains historical maps showing the location of Dubai in the

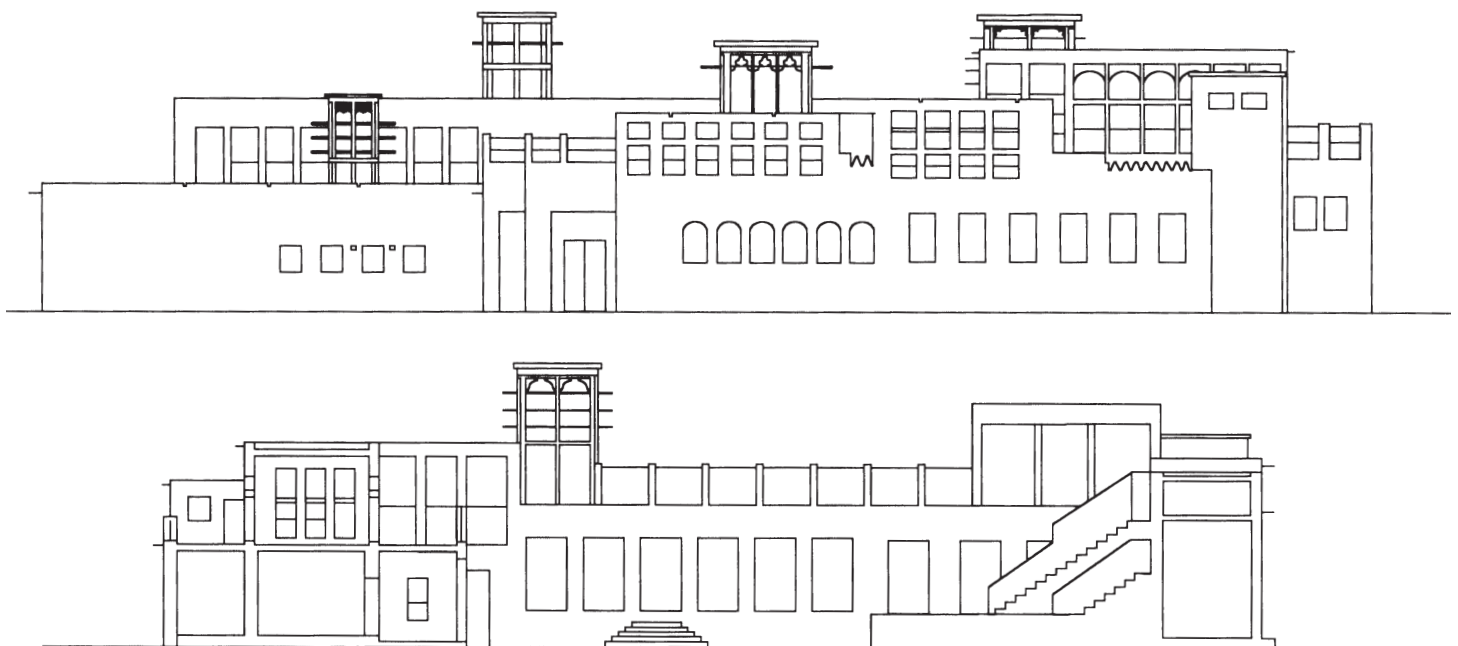
early world maps of travellers. A wing for administrative and service facilities is also provided. The *majlis* on the first floor is preserved for receiving guests with the traditional hospitality.

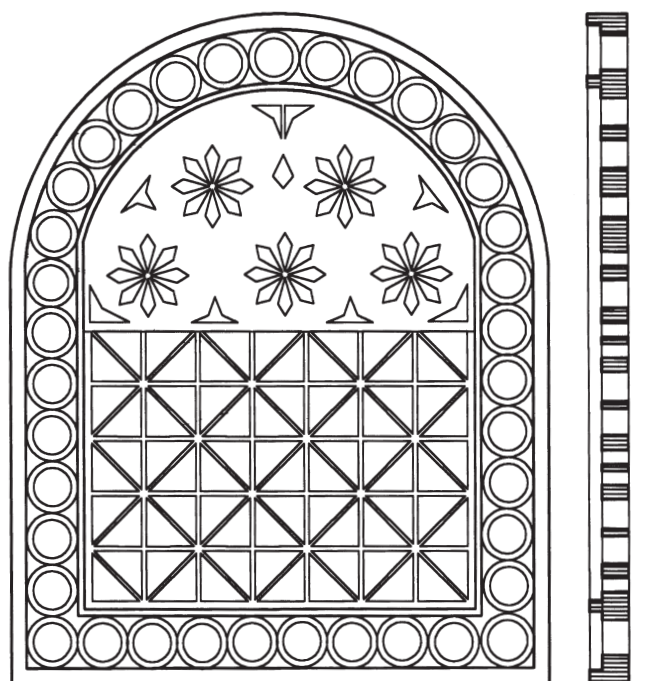
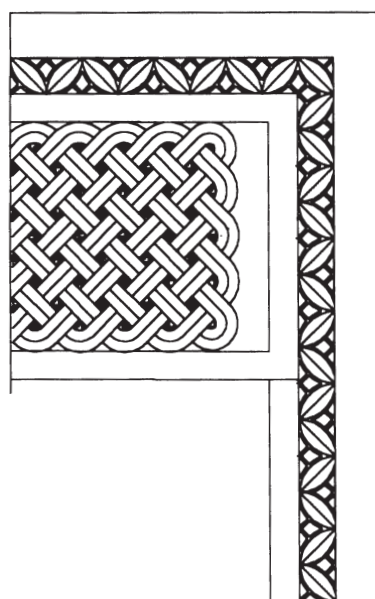
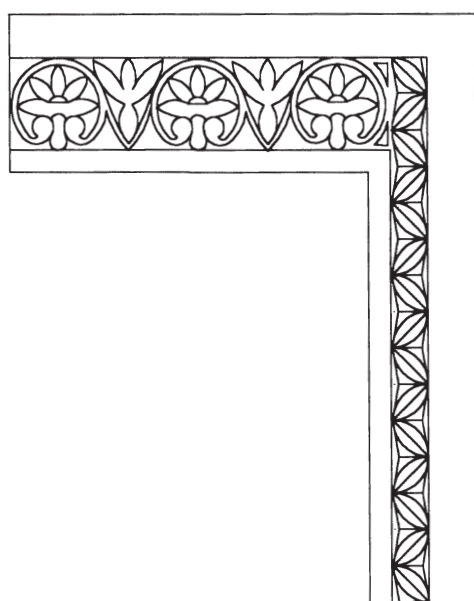
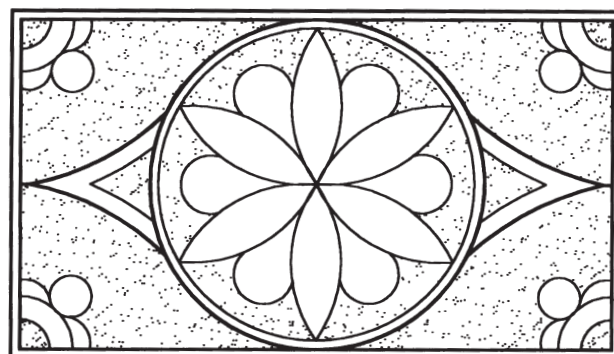
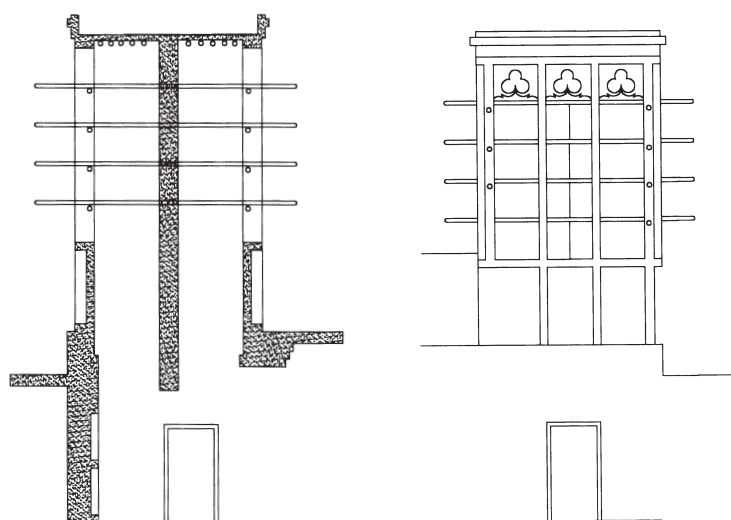
This was the first project the Municipality conducted with Makiya Associates as consultants. According to the Municipality, the latter's thorough study of the building was accompanied by an integral study of architectural planning in Dubai.

It is an exceptionally well-designed building of considerable architectural value. The articulation of the internal spaces and the details that are worked around the walls, open spaces and ventilated rooms are equally pleasing and interesting for their organization as for the conceptual sense that dictated the design. It points to a tradition of formal mansion building that existed in the architecture that evolved in the cities of the Gulf, with particular similarity in the distribution of the floor spaces and the organization of the interior and exterior spaces to the mansions of Muḥarraḡ in Bahrain. This house was effectively the only building that was excluded from the process of urban cleansing that overtook the rest of al Shandaghah quarter.

Below
Shaykh Sa'īd bin Maktūm's house:
east elevation

Bottom
Section





Top left
Shaykh Sa'id bin Maktūm's house:
windtower sections

Left
Carving details on a door frame

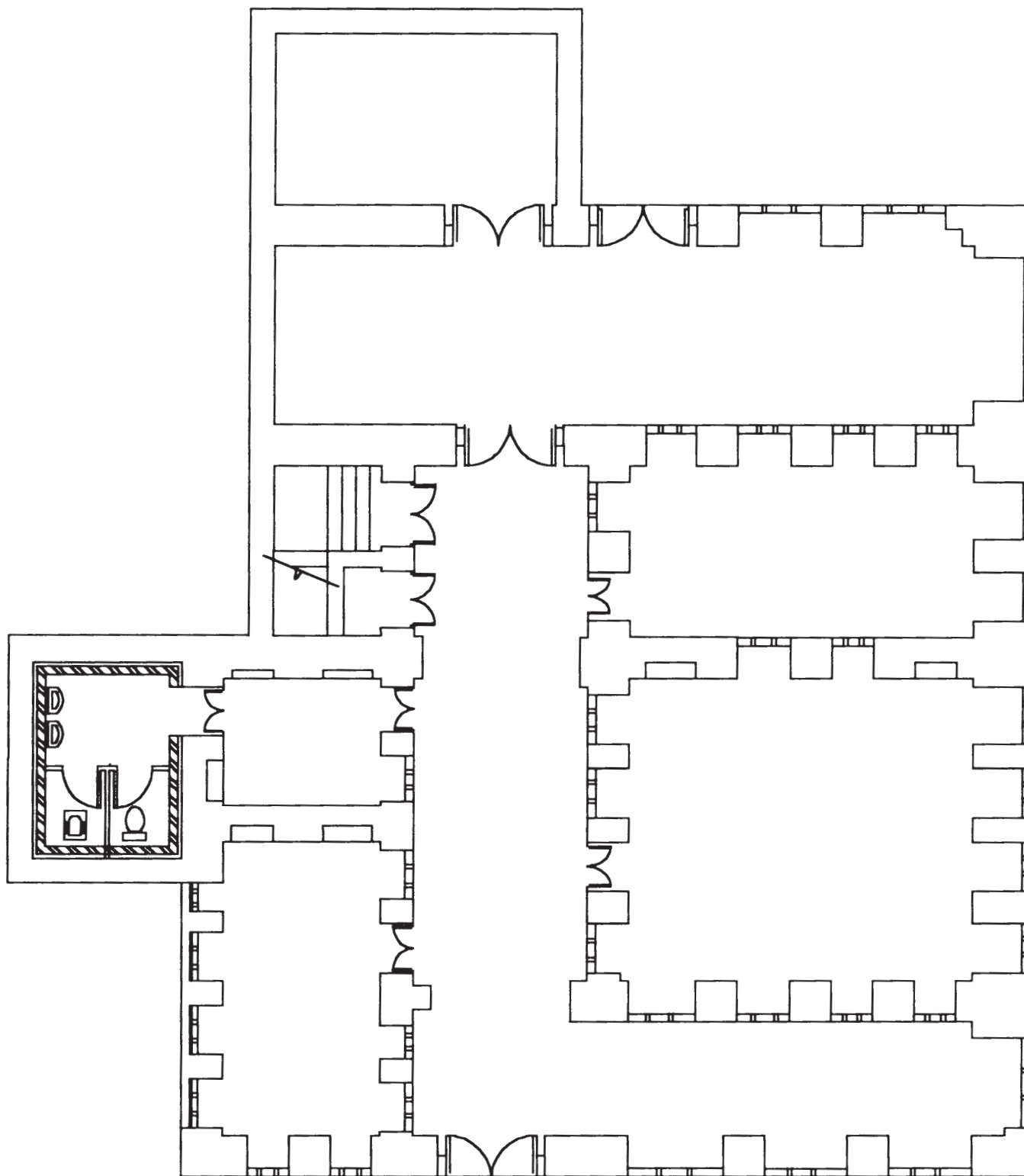
Top right
Floral details on a decorative panel

Above
Detail of patterns on decorative
gypsum screen

Bayt al Wakil

The *wakil*, 'agent', was the agent for the British India Steam Navigation Company. The house was constructed in 1934. Situated in Barr Dubai, it has a

spectacular location overlooking the Dubai creek, with access to the western entrance to the *sūq*.¹⁴ The works were commenced in 1994 and completed by 1996.



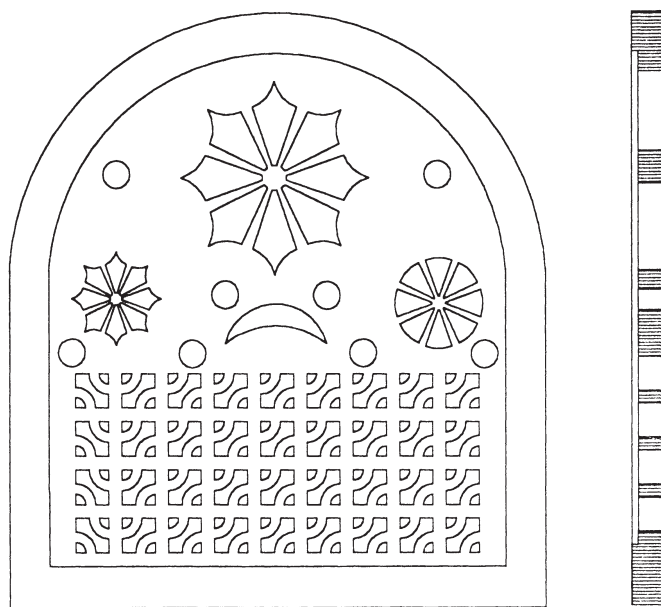
Above
Bayt al Wakil: ground-floor plan

Conservation: the al Rās quarter

This is one of the oldest quarters in Dayrah. The area was the residence of the distinguished merchants and there were a number of select houses adjacent to the Aḥmadiyyah School. The plan of the area shows a complex of ten surviving buildings, surrounded by dull modern construction.

Madrasat al Aḥmadiyyah

Located in the residential quarter of al Rās, this is thought to be one of the oldest Nizāmiyyah schools in Dubai. It was constructed in 1912 by Shaykh Aḥmad bin Dalmūk, after whom it was named. The structure was built in three phases. In the initial stage it occupied the ground floor of an original residence that was converted into a school. In the second stage an upper room was added serving as accommodation for the teachers. In the third stage the roof terrace was covered by constructing the *riwāq* gallery, arcades opening onto the courtyard, where traditional teaching classes were held. The Aḥmadiyyah was a primary school where most of the élite of Dubai studied. It is one of the rare buildings where Qur'ānic scripts are used in the stucco work to decorate the interior walls.



Above

Al Aḥmadiyyah School: details of patterns on gypsum window screens

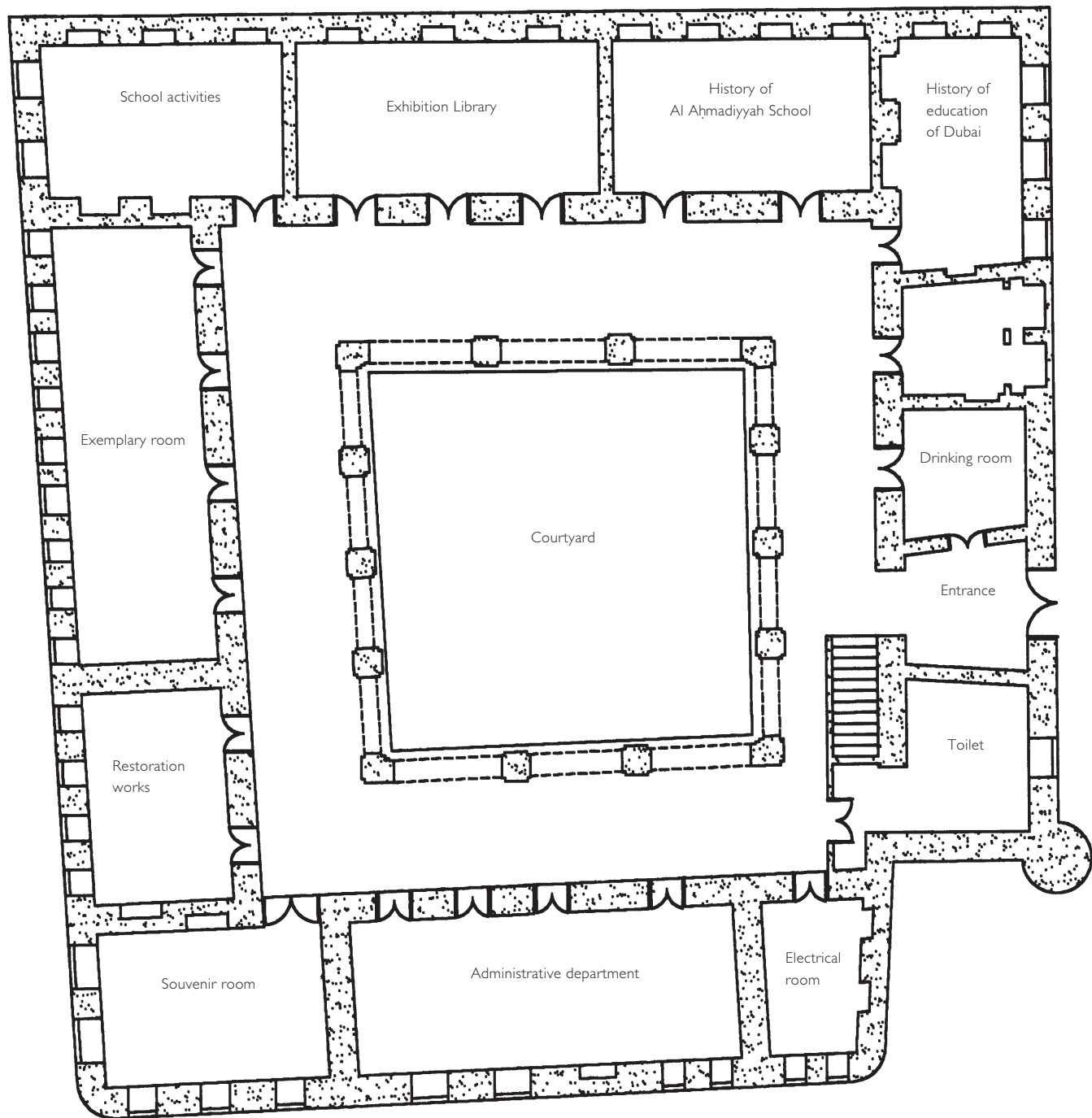
Below

Section through the courtyard



When the conservation project started in 1993 the structure of the building was in a derelict state. The *barjil* had been completely removed in the 1940s, due probably to structural cracks that had occurred in the building. This was one of the earliest projects the Municipality took over and carried out after founding the Heritage Buildings Conservation Unit. The office of Makiya worked on preparing the architectural building

design. The building was completed in the end of 1995, and the Municipality decided to turn it into a museum for learning, with specific activities and some historic documents on display, distributed according to the size of the spaces. The building has been installed with central air-conditioning through underground ducts and trenches for the electricity supply.

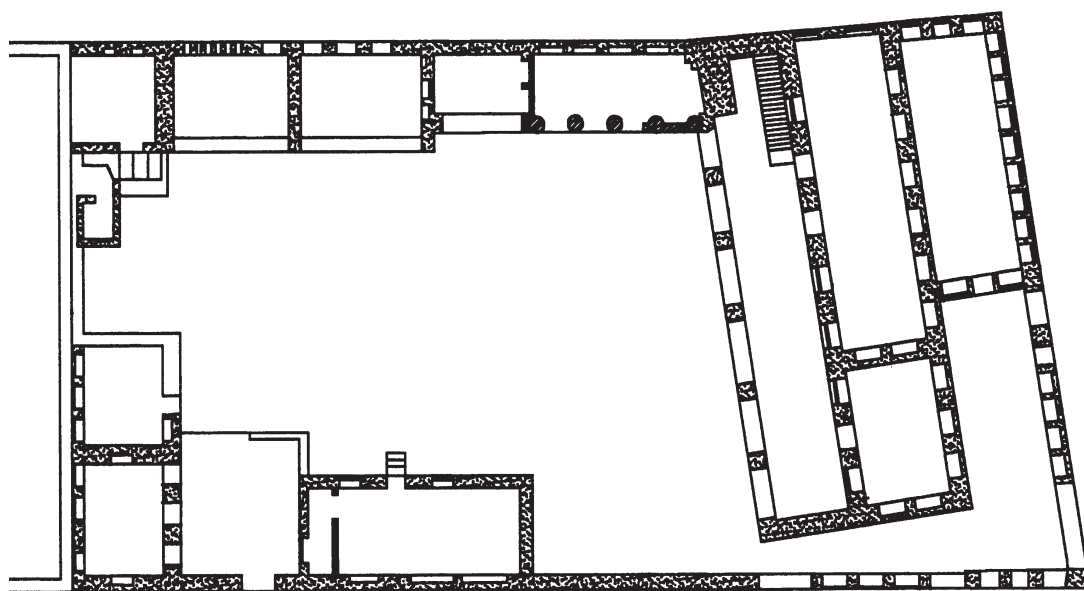


Above
Al Ahmadiyyah School: ground-floor plan

Bayt al Turāth

Adjacent to al Aḥmadiyyah, Bayt al Turāth is a large residential house with 1,800 square metres of floor space, which has been turned into a museum of traditional residential buildings. Originally owned by one of Dubai's merchants whose name was not disclosed, its ownership then changed hands on several occasions resulting in alterations and additions over the past decades. It was constructed around 1890, the architectural elements found in the building reflecting the cultural background and social status of the owner. Work on the house took two years, and was completed in 1995. After conservation of the building the decorative patterns were completely restored.

The area of al Rās in al Dayrah has witnessed a rapid cultural change due to the economic development that occurred, affecting the residents and property owners. Most of the old houses that exist here are located in the heart of the old city centre, which is also the city's traditional commercial centre. Since it was convenient for the merchants to store their stock close to their shops and offices in the *sūq*, for the last 15 to 20 years most of the old houses have been used as depots. This has meant that these buildings were hardly maintained during this period and the internal spaces have been altered to accommodate storage, including the removal of various original features and architectural elements.



Left
Bayt al Turāth: ground-floor plan

Below
Front elevation

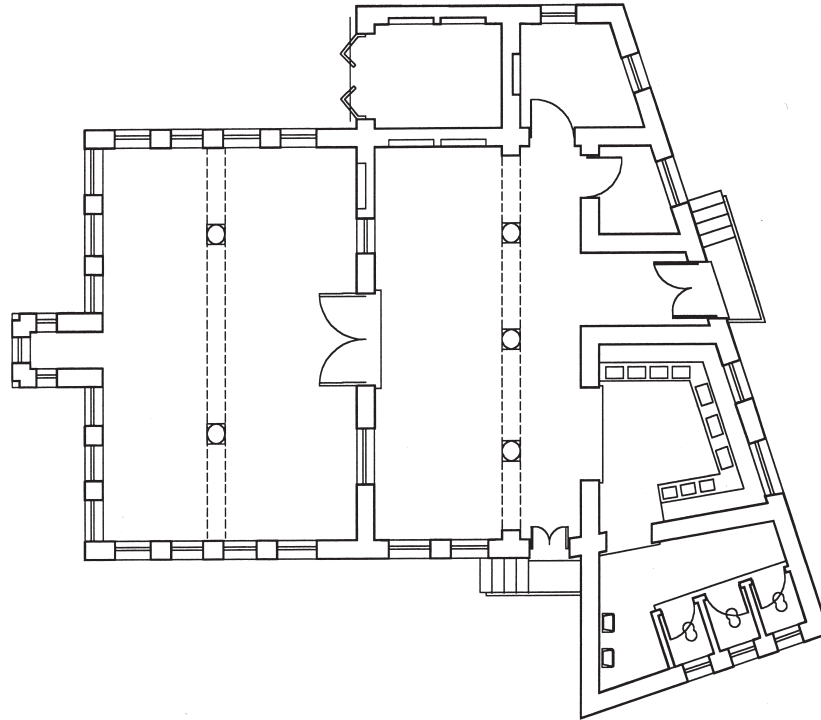


Masjid bin Dalmūk

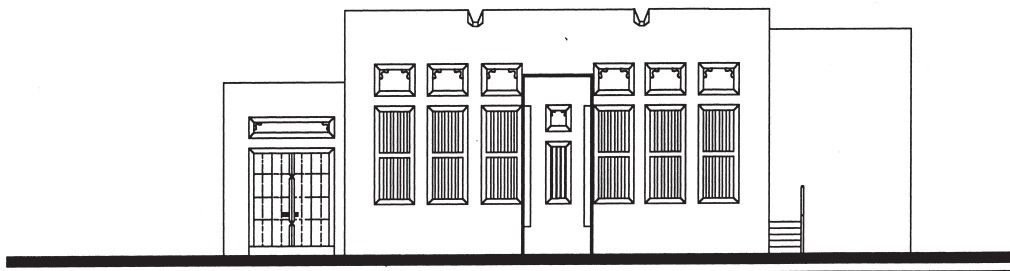
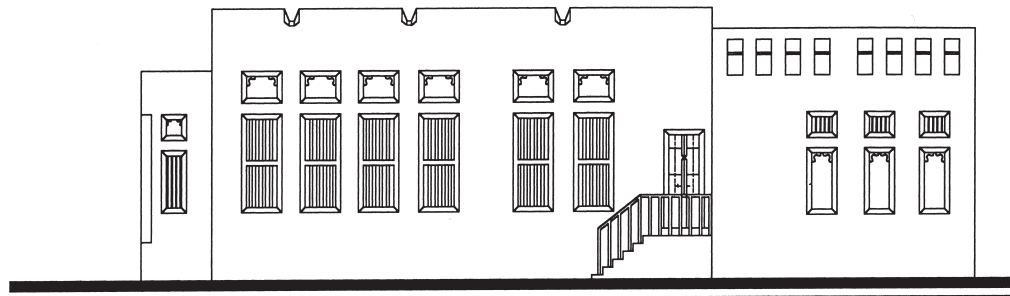
Located to the east of al Madrasah, this is also known as Masjid Lūtah, after Nāṣir bin ‘Ubayd Lūtah who was responsible for originally conserving this mosque.

According to the Municipality the mosque was completely reconstructed after it was pulled down. In

the absence of any records of the building it was not possible to restore the building to the original design; instead a ‘traditional mosque’ plan was drawn up.¹⁵



Above
Bin Dalmūk mosque: ground-floor plan



Above
South-west elevations

Conservation: Ḥattā village

A separate study was the renovation/repair of Ḥattā village, located in the mountain terrain 170 kilometres from Dubai. The village stands on a mountain slope by a lake, and both the scenery and climate are very appealing. The architecture of the village is different from the local architecture of Dubai and relies on mountain stones, rubble and palm trees rather than coral-reef and shell-stones, lime *juss* and *shandal* wood.

The conservation project of Ḥattā village was begun in 1990 by a consultant who presented complete surveys of the twenty houses of the village. Some of the houses were still inhabited at the time but others had been abandoned. The Municipality obtained the ownership of all the properties on the site including two towers (*abrāj*) at the top of the village.

According to local accounts, the village dates back at least six centuries, having been a crossroad for two trade caravan routes, one between the coast of Oman and the Gulf and the other between Fujairah and Sharjah. The early nomadic settlement became a flourishing urban centre, situated as it is amidst fertile land with abundant water from the adjacent wadis.

Due to the importance of this location the Municipality took an interest in conserving the village and appointed Makiya Associates as consultants on the

project to conduct the building survey. The remote location of the village required special logistics to transport the equipment and materials for the conservation works that were contracted, and this was completed in 1995. The majority of the twenty buildings that were restored in the first phase were traditional houses. In addition the *ḥuṣn* and a mosque and 12 smaller buildings have been renovated.

Once the project was complete investment plans were commissioned in order to exploit the buildings. A number of the buildings are to be turned into ethnic museums portraying the traditional social life; the aim is to redefine the buildings' function with the intention of



Above

View of the restored *ḥuṣn* and some of the adjacent housing under renovation and reconstruction in 1998, Ḥattā



Above

Aerial view of the Ḥattā village resort, a tourist attraction situated 170 km from Dubai, with its spectacular unspoilt surroundings

creating a tourist village. This project, it was estimated in 1996, will take some time to realize since the buildings are quite dispersed and the framework for the project is not yet developed. On a practical level the issue of land ownership and creating access to the area is a complex one, particularly because of the high compensation value of agricultural land.

Aerial views of the village give a general impression of the village's *ḥuṣn*, mosque and the largest of the houses, and the rest of the housing cluster which is composed of a variety of small, medium and large houses.

All of these buildings have been restored. Stone is used for the foundations, then mud brick (*tūb libin*) from one metre above ground level, with mud mortar. As

Ḥattā is a mountainous area, the buildings use no coral-reef stones. The ceilings were constructed out of date-palm trunks for wooden beams with *saʿf* date-palm branches thatched in matting laid on top. Heavy seasonal rains present a problem, causing deterioration of the walls. A maintenance project has been set up to repair the buildings after each rainy season. Such a continuous maintenance scheme is considered an inconvenience in modern architectural practice, but the Municipality was aware that the only alternative would have involved changing the type of building materials completely (i.e. using cement instead of the traditional materials), so defeating the purpose of the initial exercise.

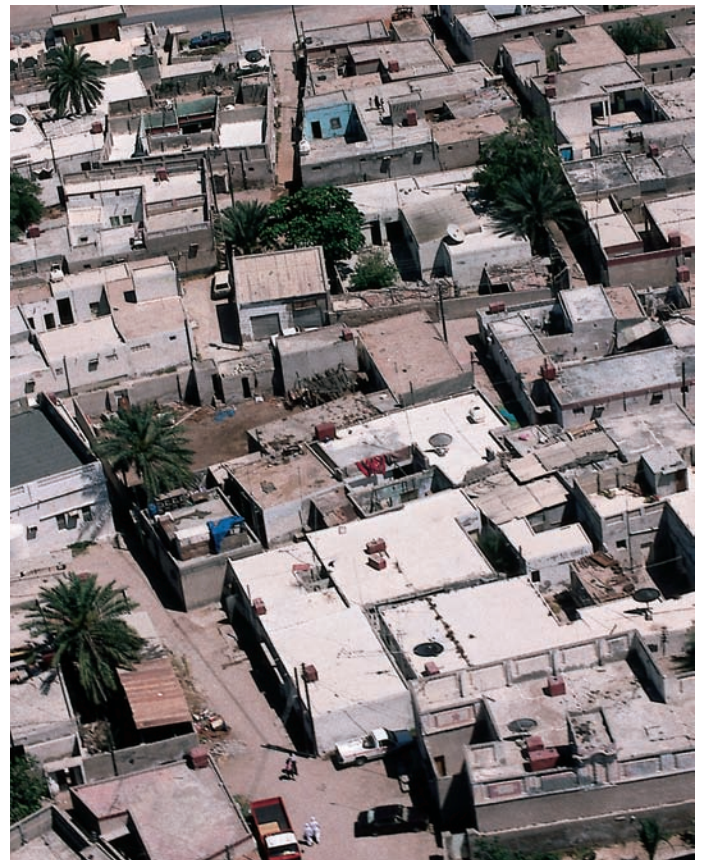
In search of the vernacular

The Northern Emirates

As one thinks about the squalid effects of urbanization, unsettling and disquieting, one reflects, with little dispassion, on how the ethos of architecture can be so blatantly breached, and the art precluded by a reduced practice that turns cities into overwhelming structures of disparity. Arriving at the Umm al Quwayn road, nature regains its control over the expanse, along with the Arabian Gulf, the desert shrubs and some palms. More importantly no buildings deflect from the serenity of this natural landscape.

Ra's al Khaymah Fort is now the city museum, located in the old quarter in the midst of an urban fabric that appears generally unappealing and dilapidated. The aerial survey shows that this is not quite the case, by revealing the core of a traditional quarter with courtyard housing and cluster planning, albeit with little architectural merit.

In his study on the architecture of Ra's al Khaymah, Walter Dostal documented the general house forms in the coastal zone, the plains and the mountains. This included a climate classification of the house types in Jazīrt al Ḥamrā, Rams, al Shimal, Ḍāyah, Khaṭṭ, Khamad



Above

Aerial view of the old housing cluster to the north of Ra's al Khaymah Fort



Above
The courtyard of Ra's al Khaymah Fort looking towards the windtower located on the north wall

Below
East-facing façade of the fort showing the entrance and the main tower on the south side



Right
Detail of blind arch on the first floor terrace at the north-west corner of the fort





Above left

Ra's al Khaymah Fort: the north-west corner tower, which is five-sided and irregular in plan, and has three storeys (cf. Kennet survey p. 103)

Above right

Crenellation detail on the south parapet wall

and the surrounding wadi settlements. He gives an account of the traditional settlement pattern of using the summer house (May to October) and the winter house (November to March).

Whereas the *'arish* type of house is common to the coastal area, in the plain between the mountains and the coast he mentions a type of rectangular flat-roofed house constructed of mud brick, known as *darish*. In the mountain zone a 'rectangular summer house' is referred to as *sayfab* (from *sayf*, summer) where the walls are built with ashlar stone (without mortar) and the roof consists of 'horizontal transoms covered with branches and brush'. This last type comes in four variations, with differences in the relative size of openings, number of entrances, and the number of walls – sometimes only three walls are built leaving the other side open for ventilation.¹⁶

The winter house types of the coastal zone are either built of stone or sun-dried bricks with a roof of palm trunks and branches covered in a thick mud layer, or the traditional *khaymah* type built entirely from date-palm branches and fronds. The plain between mountains and coast has the above two house types along with a third type known as *karin* (which Dostal identifies as a variation on the *khaymah*). This is built from sun-dried mud-brick walls and uses the lightweight palm branches

and fronds for the roof. In the mountain area these three are all found, as well as stone-built houses, *khaymah* (oval in plan) with stone walls up to 1 metre, *karin* (with stone walls instead of bricks built up to 1 metre), and a *khaymah* variation that is circular in plan with 50–80 centimetre stone walls. The ceilings are all constructed with date-palm branches and fronds for roofs.

A significant work on the formal defence type of construction, which includes well-illustrated architectural surveys of 75 known towers and structures in Ra's al Khaymah, has been produced by Derek Kennet. As architectural specimens the towers provide an interesting variety of examples, in plan and elevation. A number of these towers stand well above the housing, at 11 metres in height (including the Fort of Ra's al Khaymah). Some have three storeys, and are constructed from a variety of building materials including limestone cobbles layered into mortar, mud brick, beach-rock and coral-stone. An interesting wall building technique, identified as a layered construction, involves separate layers of one or two stone courses, and a horizontal layer of mortar creating alternate bands.¹⁷



Above

New metal door on one of the houses north of Ra's al Khaymah Fort

Jazirt al Ḥamrā'

Deserted single-storey houses constructed out of coral-reef stone and mud brick, this is one of the few settlements left in the area containing significant vernacular architecture. Two towers have been restored, Burj al Būmah and Burj al Ma'sharah.¹⁸ Some interesting wall detailing can still be discerned in the wall niches of a good number of houses.



Top

Close-up of the circular tower of Burj al Būmah, built of beach-rock and coral. The tower has been restored and appears to have had its proportions slightly altered, particularly in the top section, according to the documented surveys conducted in 1991–92 and published in Kennet (1995, p. 49)

Above

Wall detail showing the niches that appear on the exterior of a house behind the Būmah tower

Only an aerial survey could cover the length of the Northern Emirates and give an insight into the remaining fabric and buildings of the area.¹⁹ By road, these locations were not easily accessible, particularly the sporadic settlements in the area of Ru'ūs al Jibal.



Top

Close-up of a restored murabba'ah (tower) in Jazirt al Ḥamrā'. There is no reference to this murabba'ah in Kennet's study, although he does refer to another round tower, Burj al Ma'sharah (Kennet 1995, p. 50)

Above

Close-up of a distinguished courtyard mansion in Jazirt al Ḥamrā', incorporating two bād gīr and two malqaf-type windcatchers

**Top**

Aerial views of a deserted Jazīrt al Ḥamrā, showing one of the largest quarters where vernacular architecture remains. The single-storey housing incorporates courtyards and is constructed from coral-reef stone and mud brick.

Above

Aerial view of the restored Ḥuṣn Kalbā' fortress, now a museum. In the foreground is the house of Shaykh Sa'īd al Qāsimī undergoing renovation

From Abu Dhabi we flew east across the sands of Madām, beautiful dunes near al Dhayd, to the sands of Ḥattā. Then via al Maṣāfi we headed east to Fujairah and Kalbā' on the Gulf of Oman. The old housing quarter is marked by Ḥuṣn Kalbā', which has been renovated and turned into a museum for the area. There is also an

interesting house, Bayt al Shaykh Sa'īd al Qāsimī, which was undergoing renovation.

On the road between Khawr Fakkān and Dibā, also on the Gulf of Oman, is situated the Bidyah mosque, 38 kilometres north of Fujairah and 25 kilometres south of Dibā. In his account and documentation of the mosque²⁰ Nāṣir al 'Abūdī mentions that the *masjid* is named after the adjacent village of al Bidyah and that the inhabitants are aware neither of the date of its construction nor of the origin of the proper name. The form of the mosque and the flattened tetrahedron domes are almost identical to those of the Bilād banī bū 'Alī mosque in the Sharqiyyah region of Oman.²¹ The latter has fifty domes; this mosque is much smaller and square with a central pillar and loadbearing walls carrying four domes (with a total area of 53 square metres). The mosque has one entrance, on the eastern wall, and no minaret.²² The sculptural, almost voluptuous form of the pointed arches on the interior are closer to those of the Ḥuṣn Yanqul mosque in Oman.²³

**Above**

Aerial view of al Bidyah mosque from the south west. The mihrāb of the west-facing qiblah wall can be seen protruding from the back façade

**Top**

Located between Dibā and Khawr Fakkān is the mosque of al Bidyah, seen here from the east, with its four tetrahedron flattened domes that echo the style of the Bilād banī bū 'Alī mosque in Oman

Above middle

Cultivated fields separated by low parapet stone walls on one of the steps of Ru'ūs al Jibāl

Above

A few houses form one of the settlements of Ru'ūs al Jibāl, each attached to a cultivated field. A road marking appears in the background, although there is no sign of any cars across the high plateau

Right

Deserted housing in loose-set stone, Ru'ūs al Jibāl

'Abūdi draws attention to Lorimer's mention of al Bidyah, and the existence of another village in Oman in al Sharqiyyah region north-west of Bilād banī bū Ḥasan in Ja'lān by that name, which may explain why this mosque is unique in style and form among the mosque architecture of the Emirates.²⁴ However, despite the relative proximity to Ja'lān, the town of al Bidyah is actually located south of Ibrā', and within the administrative division of the province of al Qābil. That a migration took place from there to the Northern Emirates is certainly possible, considering the continuous flux and movement that took place in this territory which was within the hegemony of Oman. In any case, the architecture is definitely directly influenced by the elaborate Omānī version of Ja'lān.

We flew west from there to Ra's al Khaymah and to the mountain peaks of Ru'ūs al Jibāl. Lying north of Dibā and east of Ra's al Khaymah, the mountain terrain which extends a long way into the Musandam Peninsula of Oman is vast and green in spring. Before ascending to the plateau, on the terraces at the foothills and above the modern town of al Rams which lies between Ru'ūs al Jibāl and the coast, we saw an intact and inhabited cluster of houses which we photographed from the air before landing close by.

In Ru'ūs al Jibāl the Shuhūḥ tribes have their remote dwellings perched in the rocks in an apparently





Top
Village below Ru'ūs al Jibāl with a cluster of traditional houses attached to large courtyards

Above
Close-up of one of the courtyard houses located at the foot of Ru'ūs al Jibāl, close to the newer development of al Rams



inaccessible wilderness at a height of 2,000 metres above sea level. Single-storey stone buildings, some deserted, lie scattered. Some are built in ashlar, others in rubble work with large forecourts. Settlements of five to ten houses each are dispersed on the high plateau. They are similar in style to the neighbouring buildings of the Shuhūḥ in Musandam, except the courtyards are larger in size and there was no sign of any concrete buildings. One particular house was distinguished by the pierced narrow slit openings which ran across its whole width and length. Circular, low parapet walls surround cultivated fields on the terraces, indicating the proximity of a settlement. I could not see any roads or cars in this area and wondered how people got to their homes.

We then flew to the old housing quarter of Ra's al Khaymah. Here the courtyard-type housing close to the old fort was very interesting, and shows the transformation from the traditional type to the modern cement construction. The houses are single storey, still in keeping with the traditional courtyard form and closely packed together. From the ground the buildings appear shabby and ordinary, and there is no indication of the arrangement and quarter planning which becomes evident from the air.

From the air one realizes that the town of Jazīrt al Ḥamrā is a vast quarter. The housing cluster lies completely deserted by the sea. One house had two towering windcatchers, and there was a mosque with a quaint minaret standing alone and separate from it, with some decorative detailing painted in green. The village appeared of interest for preservation. Arches and niches featured liberally in the broken town walls, indicating a more sophisticated level of inhabitants.

Umm al Quwayn

Umm al Quwayn is characterized by the bay of Khawr al Bayḍah, with fishing boats, a fort, streets and houses and two towers along the coast. There was a complete remaining quarter with grey walls and 'arīsh canopies and roofs (as in the Khawr Fakkān orchard housing) protruding through the ceilings around the whole façade. The ḥuṣṇ appeared to be under renovation or in the course of being rebuilt.

Two towers, and a quarter which appeared empty and quite vast from the air, looked more or less intact. This was a revelation, of a deserted site considerably larger in size and scale than the traditional quarters of the other northern emirate towns. There were courtyards with trees, sometimes just one forlorn palm. It is interesting to note that all the housing has flat arcades opening in a long row onto the enclosed forecourts. This was also true of Ra's al Khaymah's modernized quarter near the museum and of Umm al Quwayn where most of the 'arish mat roofing was still in place. 'Arish shading canopies, with no walls and open on all sides, are still found in the courtyards and cultivated fields.



Above

The palm fields of Khawr Fakkān where the traditional 'arish summer dwellings are still used

Below

Umm al Quwayn, at Khawr al Bayḍah on the Arabian Gulf. The old quarter and the ḥuṣn are seen to the right in the foreground





NOTES

Introduction

- 1 Lefebvre adds that 'A "culture" is necessary not only to understand the abstract, but far more to attain the disturbing frontiers which at one and the same time distinguish and unite the concrete and the abstract, knowledge and art, mathematics and poetry.' Lefebvre, *Writings on Cities*, p. 133.

Adapting to change

- 1 See Frauke Heard-Bey, *From Trucial States to United Arab Emirates. A Society in Transition*.
- 2 Stephen Longrigg, 'The Liquid Gold of Arabia', *Journal of the Royal Central Asian Society*, vol. 36, pp. 20–3 esp. p. 21.
- 3 See monthly rainfall chart for 15 stations in UAE Ministry of Planning, *Annual Statistical Abstract*, 17th edn, pp. 17ff.
- 4 See J.G. Lorimer, *Gazetteer of the Persian Gulf, Oman and Central Arabia*, vol. II, pp. 1431ff.
- 5 See photographs by Ronald Codrai in his book *Abu Dhabi: An Arabian Album*, p. 169.
- 6 See the picture of the tower at Dhafir in the Liwā, *ibid.*, p. 171.
- 7 This expression was coined by Frauke Heard-Bey, *op. cit.*, pp. 198ff.
- 8 See Paolo M. Costa, *Musandam: Architecture and Material Culture of a Little Known Region of Oman*.
- 9 See Fred Scholz, *Nomadismus. Theorie und Wandel einer sozio-oekologischen Kulturweise*.
- 10 See B.J. Slot, *The Arabs of the Gulf 1602–1784*, and A.T. Wilson, *The Persian Gulf*.
- 11 See Lorimer, *op. cit.*, vol. I, p. 1438.
- 12 The families of the tribal pearl divers often left the sweltering humid island for the date gardens in the interior during the summer.
- 13 The expatriates came mainly from Britain, India, Egypt and Jordan but from many other countries as well.
- 14 People still remember when listening to the radio was a luxury indulged in by the few who had a car battery.
- 15 In the case of Abu Dhabi, its location was where there is now the fourth road inland from the Corniche. Dubai's first power station was on the creek near where the Municipality building stands today.

Brave New Cities

- 1 In her now outdated but popular classic *The Economy of Cities* Janet Jacobs remarked on works of imitation which 'seldom require as much trial and error as innovations do'.
- 2 Issam El Said and Ayşe Parman, *Geometric Concepts in Islamic Art*.
- 3 The reverse context of representation, and perhaps not, was advanced by John Biln in his reading of Jean Nouvel's Institut de Monde Arabe building in Paris, where this notion of representation of the other is introduced and well articulated (*Postcolonial Space(s)* p. 32). Biln says: 'The Arab Institute reveals an implicit understanding that representation-in-metonymy is incomplete ...

because representation itself is always partial: it always and necessarily both misses what cannot be represented and misrepresents what can' (p. 31).

- 4 'Cultural Creation and Change in Arab Societies at the End of the 20th Century', organized by the Institute for the Transregional Study of the Contemporary Middle East, North Africa, and Central Asia, Princeton University, Granada 4–8 May 1998.
- 5 See Oleg Grabar, *The Alhambra*, p. 93.
- 6 See this writer's introduction to *Translucent City*.
- 7 Cf. *ibid.*
- 8 For example Robert Venturi in response to Mies Van der Rohe, 'Less is Bore', and Leon Krier.
- 9 John R. Harris Architects maintained an office in Dubai since 1958. The practice was responsible for the Survey and Development Plan of Abu Dhabi, 1961 and the first Town Plan for the City of Dubai, 1958, and the review of the Development Plan in 1971.
- 10 See Salma Samar Damluji, *The Architecture of Oman*.
- 11 *Architectural Review* no. 964.
- 12 See Fredric Jameson's foreword to Jean-François Lyotard's *The Postmodern Condition: A Report on Knowledge*.
- 13 PROCESS: Architecture, MEDINAT AL SALAAM: BAGHDAD 1979–1983 no. 58, Tokyo 1985.
- 14 *Architectural Review* no. 1213, pp. 43–4.
- 15 See *Translucent City*, *op. cit.*
- 16 Related to the cultural alienation of new cities, precipitated by the economic interplay, domination and inter-influences of western culture, in other words post-colonialism. Edward Said (*Culture and Imperialism*, 1993) analyses the relationship between the 'metropole' and 'periphery', west and east respectively, and the marginalization of the culture of the 'other'. Under no circumstance should this analogy, however, redeem the 'other' of the implications which have afflicted the urban fabric of cities, in the quest of being identified or recognized within the metropole, and breaking from the associated isolation of the periphery. See this writer's paper on 'The Other Environment', *Asilah* 1994.
- 17 Al Qāshānī, *Iṣṭilāḥāt al Ṣūfiyyah*, p. 36. (This proverb is also mentioned by al Shaykh Ibn al 'Arabī, Muḥiddin, in his opus *Al Futūḥāt al Makiyyah*, and al Shaykh al Jilānī, Abdul Qādir, in *The Secret of Secrets*, and Al Ghazālī, in *The Beautiful Ninety-Nine Names of Allah*).
- 18 Al Shaykh Ibn al 'Arabī, Muḥiddin, *Al Futūḥāt al Makiyyah*, vol. II, p. 121.
- 19 Chaired by HE Sayf Bin Jābir al Hāmily.
- 20 'The concept was initiated with the creation of the Construction Lending Corporation in 1971, followed by the Commercial Buildings Supervisory Committee in 1976. The corporate structure was finalised with the issuance of an Emiri decree setting up the Social Service and Commercial Buildings Department in 1981.' Information leaflet provided by the

- Statistics Section, Department of Commercial Buildings, not dated but providing statistics up to 1 August 1995.
- 21 Ibid.
 - 22 In fact it is almost interest free at 0.5%.
 - 23 Both A. Radi and N. Ahmad in their contributions, however, make reference to the form of these constraints and bye-laws that have determined the criteria and prototype features of buildings lining the streets of the city.
 - 24 *Architectural Review* no. 964, p. 338.
 - 25 These are separately covered in later chapters.
 - 26 'The Committee for the Preservation of the Arab Islamic Architectural Style, City of al 'Ayn 1987–1990. Arabic Report' (no date, probably 1990) supplied to the writer by the Town Planning Department of al 'Ayn in January 1996.
 - 27 Shankland Cox, London 1996, compiled in 2 volumes.
 - 28 This involved a number of 'consultants' of Arab, Korean, Belgian and Tunisian origin. No one seems however to be able to name their offices. For a description of the origins and historical development of the building see el Mutwalli, Qaşr al Ḥuşn.
 - 29 An article published by Cahiers d'Art.
 - 30 This text is extracted from S.S. Damluji, *Translucent City*.
 - 31 Courtesy of Jafar Tukan, Amman.
 - 32 Courtesy of AKA, Architect's Record, UAE.P000535.
 - 33 AKA, project identification no. UAE.P000865.
 - 34 AKA, project identification no. UAE.P001442.
 - 35 A.E.J. Morris, John R. Harris Architects.
 - 36 Ott was part of NORR Group when he designed this project. He left NORR Group when the project was at working-drawings stage but oversaw the building's design.
 - 37 Description provided for the author by NORR architect Syed Ali al-Karimi.
 - 38 Quoted from Introduction to project text provided by NORR Group.
 - 39 Turner Steiner International was responsible for the construction management. The interior design was carried out by Design Division, a firm owned by the client (not affiliated to NORR Group).
 - 40 Raymond Mathewson Hood (1881–1934). His MacGraw Hill building in New York (1931) is one of the first skyscrapers built in the International Modern style. The Rockefeller Center was begun in 1931. *The Penguin Dictionary of Architecture*, 4th edn 1991, Penguin Books, London & New York, p. 214.
 - 41 Paper originally prepared for the Chicago Institute of Art in April 1999 by architect Syed Ali al-Karimi, assistant to Hans Krause, Project Manager (Emirates Towers 1996–2000), NORR Group Consultants.
 - 42 Ibid.
 - 43 The Council on Tall Buildings and Urban Habitat (CTBUH), Lehigh University, USA, monitors the heights and ranks of buildings.
 - 44 The triangle is at the heart of a complete set of Islamic patterns and configurations (based on the / 3 which have been eliminated and are less favoured than the / 2 square generated patterns) in contemporary designs in the Arab world. This is due to the political association attached to the six-pointed star, formed by two triangles.
 - 45 Winner of the 1999 Condé Nast Best Resort Hotel in the World award.
 - 46 The Wild Wadi, the second phase of the development, is a Disney aqua park covering a total area of 32 acres (64 hectares), offering 'wild wave and pool rides' and flash-flood water features in the surrounds of a 'themed heritage' landscape covering 3.1 hectares. The theme is based on an Arabic children's story of ocean-bound traders. Rockwork wadis, with timber and rope structures and a theatrical waterfall 'flood event', are the highlight of the design.
 - 47 Press Pack Jumeirah Beach Resort, WS Atkins, Head Office, Epsom (courtesy of Simon Crispe and WS Atkins & Partners, Dubai).
 - 48 WS Atkins, a British firm with head office in Surrey, has offices in Dubai and Abu Dhabi. Nearly half of its overseas business is in Asia and a quarter is in the Middle East.
 - 49 'World's Tallest Hotel' according to the 2001 edn of *Guinness Book of Records*.
 - 50 WS Atkins, (brochure) 'The Jumeirah Beach Hotel, Technological Achievements'.
 - 51 WS Atkins Press Pack, op. cit.
 - 52 WS Atkins Press Pack, ibid.
 - 53 HyperShooter®, MiniShooter® and LeapFrogs® are all registered trademarks.
 - 54 WET Design and Simon Crispe in WS Atkins Press Pack, ibid.
 - 55 Jumeirah Beach Hotel won several awards in 1999, including 'The Best International Hotel of the Year Award 1999', 'No. 1 International Leisure Attraction of the Year Award 1999' and 'Best New Business Hotel of the Year Award 1999'. In its first year it had 80 per cent occupancy, and now has near 100 per cent occupancy even through the 'off peak' season, previously unheard of in Dubai.
 - 56 The interior design of the Burj al-Arab and Jumeirah Beach Hotel was carried out by Kuan Chew Associates (London and Dubai).
 - 57 The original building programme was extended 'by creating an additional university consisting of 2 separate Polytechnic Colleges, one for women and one for men. Each comprises an Islamic studies and Shariah Law college and an Arts and Sciences college separated by an administration building and mosque ... A Police Academy building has also been constructed within the site. The entrance to the "approach avenue" of the university city complex has a public Central Library and multi-purpose auditorium'. Paper by Friedrich Ragette, 'An American University in the Arabian Desert (status of spring 2000)', unpublished, February 2000. Courtesy of author.
 - 58 Based in Jeddah, SBL Group was entirely responsible for the construction and supervising of the design for the major extension projects of the Holy Mosques in Makkah and the Prophet's Mosque in Madinah, completed in the mid-1990s.
 - 59 Paper by Friedrich Ragette, 'An American University in the Arabian Desert (status of spring 2000)', op. cit.
 - 60 I am grateful to the Dean, Professor Martin Giesen, and students of the School of Architecture at the AUS for supplying me with these measurements.
 - 61 Ragette, op. cit.
 - 62 Robin Allen, 'The Financial Times United Arab Emirates Survey', in *Education*, 21 December 1999. In conversation with Robin Allen, he elaborates: 'far from being inspired by something from the tradition of the Arabian peninsula, ... [the] design is reminiscent of not so much Mughal architecture as a

pastiche of the maharajah of Jodhpur's palace, completed in 1940, which itself is almost a pure copy of Lutyens's design – or at least the design for which Lutyens was given the credit – of the New Delhi government buildings with the grand sweep, huge scale, and mix of British Raj government practicality and sense of power, combined with Mughal grace and elegance. The concept doesn't come off in Jodhpur because it's so obviously a copy – it has some hint of provincial power, but ends up being rather stuffy, altogether lacking the sweeping inspiration and scale of Lutyens's government buildings. Even more so does AUS fail – because it lacks all three qualities – scale, sweep and power – and all one is left with is a kind of vanilla icing effect like a stage setting – a copy of a copy, so to speak.' Robin Allen, Dubai, September 2000.

Housing Development in Al 'Ayn

- 1 The text for this contribution is based on an interview held with Talal M. Abdullah (Head of Planning and Design, Government of Abu Dhabi, Town Planning Department, al 'Ayn) in al 'Ayn, April 1997.
- 2 'Post Occupancy Evaluation', a research paper presented to the 'UAE Housing and Urban Planning Conference', UAE University, February 1986.
- 3 The origins of these strictures can be found in the boom in urban expansion of 1985, which necessitated permits to be granted on the spot to facilitate fast-track construction.
- 4 This occurred in al Shahāmah or Nā'il and in the other new residential developments on the main road between Abu Dhabi and Dubai, which were effectively built in the middle of nowhere, out of nothing, on the instructions of the Shaykhs.
- 5 This settlement policy was implemented extensively in the south: 100 houses in al Zāhirah, al 'Ayn, 200 houses at al Qaw', and 100 houses at al Wajan, all incorporating a distribution of new fields.

The Islamic Architecture of Dalmā Island

- 1 In March and April 1992, the Abu Dhabi Islands Archaeological Survey (ADIAS) carried out fieldwork on a number of offshore islands in the Western Region of Abu Dhabi including the island of Dalmā. The ADIAS team undertook a preliminary survey of Dalmā, as well as the islands of Šir Banī Yās and Marawah to identify archaeological remains and to recommend what level of protection should be provided where sites were threatened by development. The ADIAS team is based at the School of Oriental and African Studies (SOAS), University of London, and in Abu Dhabi, and is directed by the present writer. Team members in 1992 included Miss Beatrice de Cardi OBE, Ms Robyn Stocks, Mrs Caroline Lehmann, Ms Fiona Baker, Mrs Joan Wucher King, and Mr David Connally. Mr Connally was responsible for producing for ADIAS the ground plans and the elevations published here.

The results of the first season on the islands are recorded in G R D King, *Abu Dhabi Islands Archaeological Survey* (ADIAS 1), 'An Archaeological Survey of Šir Banī Yās, Dalmā, and Marwah' (21 March to 21 April 1992).

- 2 K. Flavin and E. Shepherd, 'Fishing in the Gulf: Preliminary Investigations at an Ubaid Site, Dalmā, (UAE)', *Proceedings of the Seminar for Arabian Studies* 24 (1994), pp. 115–34.

- 3 G. Harter, S. Cleuziou, J. P. Laffont, J. Nockin and R. Toussaint, *Emirat d'Abu Dhabi. Propositions pour Dalmā*, (Sept.–Oct., 1979), pp. 10–15.
- 4 G. R. D. King, 'Islamic Architecture in Eastern Arabia', *Proceedings of the Seminar for Arabian Studies* 8 (1978), p. 28, Pl. 11.
- 5 Muhammad J. al-Khulayfi, *Al-'Imārat al-Taqlidiyah fi Qaṭar*, p. 129, Pl. 52.
- 6 G. R. D. King, 'Islamic Architecture in Eastern Arabia', *Proceedings of the Seminar for Arabian Studies* 8 (1978), pp. 15–28.
- 7 G. R. D. King, 'Bayt al-Mu'ayyad. A Late Nineteenth-Century House of al-Baḥrayn', *Arabian Studies* 4 (1978), pp. 27–45.
- 8 In the course of the restorations by the Sharjah Department of Antiquities, underlying structures were located beneath the al Muraykhī mosque which were accompanied by late Islamic ceramics of the Julfār horizon, i.e., c. fourteenth/fifteenth–seventeenth centuries AD.
- 9 These were excavated by the British team excavating at Julfār in Ra's al Khaymah in 1991/1992.
- 10 Local terminology for these windows was either *darīshab* or *darāyish* (pl).
- 11 Large beams used in roofing were termed *danchil* or *danshal* (shandal). The wood, like all the other wood in these buildings, was said to have come from India.
- 12 We were told that the short column on the miḥrāb signified the Shi'ah associations of the mosque. I am by no means sure of the correctness of this, although the column is not a general feature of mosques in the region.
- 13 The mosque was no longer in use in 1992 and was collapsing, with its roofing lost and doors and window shutters hanging from their hinges: however, since then, like the rest of the Dalmā buildings, it has been restored.
- 14 The term used for these doors was *dirwāzab*. The wood used for doors at Dalmā was teak (*sājj* or *sayy*) said to have come from India. The carpenters (*najjārīn*) who did the wood carving were from Dalmā itself. By contrast, we were told that the specialists who built the finest structures were from Iran. The builders were *huwāla*, i.e. Arabs from the Iranian shore of the Gulf.
- 15 D. Whitehouse, 'Excavations at Siraf. Fifth Interim Report', p. 74 and fig. 7, p. 75.
- 16 B. de Cardi, *Qaṭar Archaeological Report: Excavations* 1973, p. 190 and Pls xxxi–xxxii; H. Kapel, 'Rock Carvings at Jebel Jusasiyah, Qatar', *Arrayan*, no. 8 (unseen); W. Facey, 'The Boat Carvings at Jabal al-Jussasiyah, Northeast Qatar', *Proceedings of the Seminar for Arabian Studies* 17 (1987), pp. 199–222; D. F. Hawkins, 'Primitive Rock Carvings in Qatar', *Proceedings of the Seminar for Arabian Studies* 17 (1987), p. 54.
- 17 G. R. D. King, *The Historical Mosques of Saudi Arabia*, pp. 168–9.
- 18 D. Whitehouse, *Siraf III. The Congregational Mosque and other Mosques from the Ninth to the Twelfth Centuries*, p. 9.
- 19 E. Diez, 'Eine schiitische Moschee-ruine aus der Insel Bahrein', *Jahrbuch des asiatischen Kunst* 2 (1925), pp. 101–5.
- 20 The Ibn Khamis mosque (1186/1772–3), the 'Abd Razzāq mosque (1212/1797–8), the al Khalifah mosque (mid-nineteenth century?), the al Thaiba mosque, the Dayj mosque and the mosque of Ibn Ibrāhīm bin Isma'il (1331/1912–3): Lewcock and Freeth, pp. 72–7.

- 21 Ibid. pp. 180–2. These include the two-storey Rajihīya mosque, and a mosque in the oasis north of the town.
- 22 Ibid. pp. 184–8; the *jāmi'* and a fragmentary mosque both existed in 1972–3, but vanished thereafter.
- 23 Ibid. pp. 169–77. The mosque of Ibrāhīm 977/1569–70; the al Jabrī (820/1417); the al Jabrī mosque (963/1555–6); the Sharafīya mosque; and the Maghlūth mosque nearby at al Mubarrāz.
- 24 An 'Abbasid mosque has been excavated at Marwab in northern Qaṭar while a number of later mosques have been published, including the Ibn 'Abd al Wahhāb mosque at al Khawr, the Abū Qubayb mosque; the al Dhukhayra mosque; the mosque of Umm Salāl Muḥammad, the mosque of Umm Swai Jah and the Mosque of Sumaismah. See especially Muhammad J. al-Khulayfi, *Al-Imārat al-Taqlidiyyah fī Qaṭar*. See also C. Hardy-Guilbert, 'Recherches sur la Période Islamique au Qaṭar', *Mission archéologique française*, pp. 111–27; esp. pp. 112–18. C. Hardy-Guilbert, V. Aitzegagh and V. Defert, *Qatar: fann al-Imarat/Qaṭar: architectures*, pp. 16–19.
- 25 Walter Dostal, *The Traditional Architecture of Rās al-Khaimah (North)*, p. 47.
- 26 G. R. D. King, 'Excavations of the British Team at Julfār, Ras-al-Khaimah, United Arab Emirates: Interim Report on the Second Season (1990)', *Proceedings of the Seminar for Arabian Studies* 21 (1991), pp. 123–34; 'Excavations of the British Team at Julfār, Ras-al-Khaimah, United Arab Emirates: Interim Report on the Third Season', *Proceedings of the Seminar for Arabian Studies* 22 (1992), pp. 47–54.
- 27 P. M. Costa, *Musandam. Architecture and Material Culture of a Little Known Region of Oman*, pp. 72–6.
- 28 N. H. al-'Abūdi, *Masjid al-Bidiyya (Dirasāt arkeulujīya tarikhīya)*; D. Willems and S. Allaire, 'Bidiyah Mosque', in C. Hardy-Guilbert, *French Archaeological Mission at Julfār, United Arab Emirates*, pp. 73–6.
- 29 D. Whitehouse, *Siraf III. The Congregational Mosque*, p. 56.
- 30 G. R. D. King, *Historical Mosques*, pp. 184–6.
- 31 Ibid., e.g. pp. 126, 131, 132, 134, 146–9, 154–5, 162, 164.
- 32 Ibid., pp. 93–4.
- 33 Ibid., pp. 60–1.
- 34 E. Rutter, *The Holy Cities of Arabia*, p. 51.
- 35 S. A. al-Rashid, *Al-Rabadha. A Portrait of Early Islamic Civilisation in Saudi Arabia*, pp. 22–3.
- 36 D. Whitehouse, *Siraf III. The Congregational Mosque*, pp. 30–57.
- 37 G. S. P. Freeman-Grenville, 'Manāra, Manār' (3. East Africa), *Encyclopaedia of Islam*.
- 38 G. Hardy-Guilbert, 'Recherches sur la Période Islamique', p. 114.
- 39 R. Lewcock and Z. Freeth, *Traditional Architecture in Kuwait and the Northern Gulf*, pp. 72–3.
- 40 D. Whitehouse, *Siraf III. The Congregational Mosque*, pp. 4–9; Figs 3–4.
- 41 G. R. D. King, *Historical Mosques*, pp. 172–3.
- 42 G. R. D. King, 'Excavations of the British Team at Julfār, Ras-al-Khaimah, United Arab Emirates: Interim Report on the Third Season', *Proceedings of the Seminar for Arabian Studies* (1992) 22, p. 49, Figs 1, 2.
- 43 E. Essaian and D. Willems, 'Falayah Mosque', in C. Hardy-Guilbert, *French Archaeological Mission at Julfār, United Arab Emirates*, pp. 68–72.
- 44 P. M. Costa, *Musandam: Architecture and Material Culture*, p. 72.
- 45 G. R. D. King, *Historical Mosques*, pp. 172–3; p. 185.
- 46 N. H. al-'Abūdi, *Masjid al-Bidiyya*, p. 26; D. Willems and S. Allaire, 'Bidiyah Mosque', Fig. 44.
- 47 G. R. D. King, *Historical Mosques*, pp. 171–2.
- 48 Ibid., pp. 38–9.
- 49 Ibid., pp. 117–20.
- 50 Ibid., pp. 147–8.
- 51 J. Schacht, 'Ein archaischer Minaret-typ in Ägypten und Anatolien', *Ars Islamica* 5 (1938), pp. 30–57.

The Urban Architecture of Al Bastikiyyah

- 1 F. Heard-Bey, *From Trucial States to United Arab Emirates*, p. 19.
- 2 Ibid., p. 242.
- 3 According to Alison Coles and Peter Jackson, *A Windtower House in Dubai*, p. 4, the decision for some families to move permanently to Dubai was precipitated by Reza Shan's legislation in 1936 abolishing the use of the veil.
- 4 The al Fahīdi Fort, built in 1799, is the oldest surviving structure in Dubai and was used as a residence of the Ruler until 1890. The Fort is now a part of the Dubai Museum.
- 5 A. Coles and P. Jackson, *A Windtower House in Dubai*, p. 2.
- 6 According to D. E. J. Morris, p. 8, 'the town plan was drawn up at a critical moment in Dubai's history, before the construction boom of the succeeding decades. Sheikh Rahid himself was personally involved in considering the main aspects of the plan preparation.'
- 7 F. Heard-Bey, *From Trucial States to United Arab Emirates*, p. 263.
- 8 A. Coles and P. Jackson, *A Windtower House in Dubai*, p. 10.
- 9 Ibid., p. 10.
- 10 Ibid., p. 13.
- 11 Marco Polo, p. 312.
- 12 A. Coles and P. Jackson, *A Windtower House in Dubai*, p. 13.
- 13 Ibid., p. 18.
- 14 Ibid., p. 18.
- 15 Ibid., p. 14.
- 16 Ibid., p. 18.
- 17 Ibid., p. 8.
- 18 Ibid., p. 8.
- 19 According to R. Codrai in *Palm Fronds, Coral-stone and Gypsum: The Architectural Heritage of the United Arab Emirates* one of the ways of widening a room 'was to strengthen the walls and use them to support a heavy teak beam – often cut from the old mast of a ship – on which the shandol poles could be laid.'
- 20 A. Coles and P. Jackson, *A Windtower House in Dubai*, p. 8.
- 21 Ibid., p. 8.
- 22 Petrified coral stones are still available in coastal areas. 'Traditional Architecture of Dubai', *Arts and the Islamic World*, Nos. 27 and 28.
- 23 A. Coles and P. Jackson, *A Windtower House in Dubai*, p. 8.
- 24 Ibid., p. 10.
- 25 Plot ratio is the relationship between plot area and floor space, a plot ratio of 1:1 would produce a single-storey building over 100 per cent of the site, or a two-storey building over half the site. Plot ratio is a useful tool for analysing existing development and for controlling new development as it can be used to directly control building massing and urban form.

- 26 'The water table is tidal and has resulted in weak foundations. The weight of the masonry windtowers can cause vertical cracking in the walls beneath. Further weakening of the masonry has been caused by thermal stress. Much of the timber has been heavily attacked by insects.' A. Coles and P. Jackson, *A Windtower House in Dubai*, p. 28.
- 27 Over fifty single labourers per dwelling have been recorded.

The Ancient Mosques of Ra's al Khaymah

- 1 On this subject, B.J. Slot in *The Arabs of the Gulf, 1602–1784*, p. 49, points out that European travellers hardly ever ventured inland; did they think these territories were too hostile, or of little economic interest?
- 2 In an article published in Paris, 1979, S. Cleuziou was already making similar suggestions with regard to the architectural heritage of the island of Dalmā (Emirate of Abu Dhabi): 'Comme partout, l'irruption de la vie moderne est à Dalma une menace pour les vestiges du passé.' [The invasion of modern life is to Dalmā, as it is everywhere else, a threat to the remnants of the past.] On the subject of the Islamic ruins brought to light in that work, the reader should turn to the contribution of Dr G. King in this book.
- 3 The task began in 1995 during a French archaeological expedition in Julfār, led by Dr C. Hardy-Guilbert. In the spring of 1996 an assignment was undertaken, thanks to the backing of His Excellency Shaykh Sulṭān bin Ṣaqr al Qāsimī, Director of the Department of Antiquities and Museums of Ra's al Khaymah.
- 4 The results, having been obtained, will be published in part in a work in preparation. The entirety of the study will take the form of a doctoral thesis soon to be undertaken in Paris IV-Sorbonne.
- 5 Certain characteristics are duplicated in distant territories. One example among these is the positioning of the *miḥrāb* or *minbar* in an apse. This feature is reproduced in mosques built in eastern Africa. Do they have a common origin? Perhaps Yemeni or Omani? If so, which communities transported this innovation?
- 6 Several different written forms of this name are to be found in ancient literature: Reçoyma, Raçolhiman, Racolmia, Rachollima, or Ras'ul-Khema. Ra's al Khaymah is sometimes linked with the port of Djulfār/Julfār, notorious well before the sixteenth century AD (tenth century AH). The ruins of this city were partially excavated by a combined international study consisting of four teams. Among these, a French team (led by Dr C. Hardy-Guilbert) concentrated on the fortifications, while a British party (under the guidance of Dr G. King) carried out its research on the different construction phases of the nearby mosque, which stands directly east of the said fortifications.
- 7 B. J. Slot, *The Arabs of the Gulf*, pp. 23ff. They had control of territory that varied considerably in dimension over the centuries. It is certain that their links with the northern coasts and their domination of the Omani Peninsula made an impact on economic and cultural levels.
- 8 W. Dostal, *The Traditional Architecture of Ras al-Khaimah (North)*, p. 47: 'The influence of this movement on cult buildings had a lasting effect inasmuch as it forbade, among other things, saint-worship and pilgrimages to the tombs of saints.'
- 9 A city on the coast, about 12 miles south of the capital, Ra's al Khaymah.
- 10 Information supplied by His Excellency Shaykh Sulṭān bin Ṣaqr al Qāsimī, Director of the Department of Antiquities and Museums.
- 11 The Qawāsim were a branch of the Huwala, and originated from the Iranian coast. See G. Rentz, 'Al-Kawāsim' in *Encyclopédie de l'Islam*, pp. 808ff; A.M. Morsey, *The United Arab Emirates, A Modern History*, p. 39.
- 12 The *jāmi'* is sometimes called the Friday mosque or Great Mosque. Although the first appellation could be justified because of the large congregation attracted on the principal day of prayer, the latter is misleading as this type of mosque is not necessarily as majestic and spacious as this title might suggest (cf. the mosque in Falayyah, no. 2).
- 13 M.A. Biancifiori, *Works of Architectural Restoration in Oman*, pp. 148ff.
- 14 Excavated by British teams led by Dr G. King.
- 15 Excavated in April 1996 by an expedition led by D. Willems. This mosque was brought to light thanks to the collaboration of a local dignitary whose father used to perform his ritual prayers there every day.
- 16 According to a preliminary report made by D. Connolly in 1993. 'An Explanation as to the Phasing of British Julfar, Seasons III–V; Mosque and Occupation Area, Preliminary Report, September 1993'. The final study will be published in a collection of works concerning research carried out on the Julfār site between 1989 and 1995.
- 17 The use of stone in order to reinforce the foundations and the mud brick walls of the Julfār fortifications is manifest. See C. Hardy-Guilbert, *Mission archéologique à Julfar, Emirate Arabe Unis*.
- 18 D. Kennet, *The Towers of Ras al-Khaimah*, p. 6.
- 19 *Mankrūr* is a term in common use, used to describe the palm-leaf matting which is stretched over the beams in order to support the earthen roof-covering.
- 20 The *bād gir*, or *malqaf*, is the windcatcher and traditional type of ventilation system.
- 21 W. Dostal, *The Traditional Architecture of Ras al-Khaimah (North)*, p. 47.

The Forts and Towers of Al 'Ayn

- 1 *The Buraimi Dispute*, vol. 1, pp. 645–6.
- 2 Ibn Hilāl papers, no number or dates, Documentation Centre, Abu Dhabi.
- 3 See *The Buraimi Dispute*, vol. 22, and *Buraimi Memorials*.
- 4 A. Ibn Qayṣar, *Sirat Nāṣir bin Murshid*, p. 89.
- 5 P. Cox, 'Some Excursions in Oman', *The Geographical Journal*, LXVI, July 1925.
- 6 See J.C. Wilkinson, *The Imamate Tradition of Oman*, pp. 249–316.

In Search of the Vernacular

- 1 In his published MA thesis, Durham University, based on field work he did in 1987 and updated in 1991, Graham Anderson gives an account of the old quarters, prominent houses and the recommendation to restore the existing architectural heritage. The mosques of Sharjah that he mentions are: Maṣjid al Nābūdāh, Maṣjid al Zar'ūnī or al Zarā'inah, Maṣjid al Khān, Maṣjid al Manānī'ah and Maṣjid al Liyyah. *Sharjah (UAE): The Urban Conservation Dilemma*.

- 2 A.S. al 'Azzāwī was responsible for conservation projects in Iraq that included the transfer of 'Ānah minaret, the conservation and repairs on Nabī Yūnis mosque in Mūṣul (Mosul), Ḥuṣn al Ukhayḍir and the old town of Baṣrah. The procedures and techniques he used in the above and in the conservation rebuilding works in Sharjah are documented in his *Al tarmīm wal ṣiyyānah lil mabānī al athariyyah wal turāthiyyah* (*The Repair and Maintenance of Archaeological and Heritage Buildings*).
- 3 A.S. al 'Azzāwī, *Al tarmīm wal ṣiyyānah lil mabānī al athariyyah wal turāthiyyah* (*The Repair and Maintenance of Archaeological and Heritage Buildings*).
- 4 The conservation of this *sūq* is the subject of a paper by Nāṣir al 'Abūdī. In it he gives an account of the *sūq* having flourished in the period between the 1930s and the early 1960s. The ground area after the complete renovation is 8,522 square feet, of which the shops occupy 498 square feet, and the central square 404 square feet. 'Tarmīm sūq al 'araṣah bil Shāriqah', in *The 'Uways Awards Book, second cycle, 1991*.
- 5 Graham Anderson, *Sharjah*, pp. 204–6, 247.
- 6 Ibid. p. 220.
- 7 See S.S. Damluji, Glossary in *The Architecture of Oman*.
- 8 See chapter by K. Olroyd-Robinson in this book.
- 9 Al Diwān al Amīrī by J.R. Harris Architects, and submitted to the Aga Khan Award. (Also mentioned by this writer in the 'Brave New Cities' chapter in this book.)
- 10 This department developed from the Unit for the Restoration of Archaeological Buildings that was formed 1991, and was responsible for several projects including the conservation of Ḥuṣn al Fahidī (currently Dubai Museum) and Ḥattā village.
- 11 See Historic Buildings Department, Dubai Municipality, 'The Conservation of the Architectural Heritage in Dubai Emirate, Arabic'. Part of the Municipality's documentation, listing the main projects with the historic background and information on the building, appeared in 'Traditional Architecture of Dubai', Special Supplement, *Arts and the Islamic World*, nos. 27 & 28.
- 12 Based on field research conducted with the assistance of the Municipality in 1996. I am particularly grateful to Rashād Būkhash and 'Ādil Maḥjūb 'Abdullah of the Historic Buildings Department for supplying both the information and the Municipality architectural survey files of the buildings published here.
- 13 For the 1995 Award Cycle, Restoration of Shaykh Sa'id House (project identification no. UAE P000865), courtesy of the Aga Khan Award for Architecture, Geneva.
- 14 See *The Conservation of the Architectural Heritage*, Dubai Municipality, pp. 17–20.
- 15 Ibid. pp. 38–9.
- 16 W. Dostal, *The Traditional Architecture of Rās al-Khaimah (North)*, pp. 11–25.
- 17 Derek Kennet, *The Towers of Ras al Khaimah*, p. 25.
- 18 See ibid. for an account on these two towers and the architectural surveys, pp. 48–51.
- 19 Thanks to the suggestion and organization of HE The Minister of Information and Culture, Shaykh 'Abdullah bin Zāyid Āl Nahyān a helicopter journey was carried out with the Bu'ayn Air Force in April 1998.
- 20 Nāṣir Ḥussain al 'Abūdī, *Masjid al Bidyah*.
- 21 See S.S. Damluji, *The Architecture of Oman*, pp. 367–71.
- 22 Al 'Abūdī, p. 28.
- 23 See S.S. Damluji, *The Architecture of Oman*, pp. 310–12.
- 24 Al 'Abūdī, p. 25.

GLOSSARY

<i>abrāj</i>	tower	<i>kbyāt</i>	renovation technique of reinforcing cracked walls with horizontal ties, literal meaning is ‘stitching’
‘ <i>arish</i>	date-palm or coconut-palm frond stems, commonly used as a building material	<i>līwān</i>	colonnaded walkway (also <i>iwān</i>)
‘ <i>arishab</i>	palm-frond house with a sloping roof	<i>madar</i>	sun-baked bricks
<i>bā‘</i>	unit of measurement – the span of outstretched arms	<i>madrasah</i>	school
<i>bād gīr</i>	mid-wall windcatcher for building ventilation (also <i>malqaf</i>)	<i>majlis</i>	traditional reception
<i>baḥrī marjānī</i>	a type of building stone, differentiated into two types: <i>bim</i> and <i>salafa</i>	<i>malqaf</i>	windcatcher
<i>bannāy</i>	traditional builder	<i>mankūr</i>	palm-frond matting stretched over roof beams to support roof covering
barasti	(not an Arabic word): palm-frond house	<i>masbrabiyyah</i>	wooden window grille or screen
<i>basīl</i>	bamboo lattice used for roofing, said to be imported from India	<i>masjid</i>	mosque for daily use (as opposed to <i>jami‘</i>)
<i>bayt sha‘ar</i>	winter tent erected outside a dwelling for the reception of visitors	<i>maṭbakh</i>	kitchen
<i>burj</i>	tower	<i>mabwasab</i>	polygonal tower
<i>dakkab</i>	elevated platform at the front of a house for the erection of a <i>bayt sha‘ar</i>	<i>miḥrāb</i>	<i>qiblah</i> niche in the mosque
<i>danchil/danshal</i>	large beam used in traditional roofing	<i>minbar</i>	pulpit
<i>darish</i>	rectangular flat-roofed house constructed of mud bricks	<i>murabba‘ab</i>	tower house, square
<i>darishab</i>	rectangular window with vertical iron bars	<i>nārjīl</i>	coconut palm
<i>dbirā‘</i>	unit of length, equal to the length of the forearm (approximately one-and-a-half feet)	<i>qiblah</i>	orientation of a building towards Mecca
<i>dirwāzab</i>	ceremonial doors of a dwelling or gateway	<i>qāmah</i>	unit for measuring room height, literal meaning is the height of a person
<i>dirwāniyyah</i>	men’s reception area in a dwelling	<i>raddab</i>	L-shaped house entrance
<i>drāyish</i>	opening in a wall for a window or niche	<i>riwāq</i>	entrance space or chamber; external area of a mosque used for prayer
<i>du‘ūn</i>	palm-tree branches	<i>ṣābāt</i>	space which opens onto a courtyard
<i>falaj</i>	irrigation tunnel	<i>sa‘f al nakhīl</i>	woven panels of palm fronds
<i>fana‘</i>	central courtyard of a dwelling (also <i>ḥrwi</i> , <i>ḥawī</i> , <i>ḥawsh</i>)	<i>saḥn</i>	courtyard
<i>farkhab</i>	smaller door within the <i>dirwāzab</i> , for everyday use	<i>ṣāj/sayy</i>	teak imported from India for fine carpentry
<i>fārūsh</i>	a traditional form of plaster	<i>ṣalḥab</i>	wall rendering using <i>juṣṣ</i>
<i>ḥammām</i>	bath	<i>ṣārūj</i>	a type of mortar made by mixing red clay and manure, then dried and baked
<i>ḥawī</i>	see <i>fana</i>	<i>sās</i>	foundation
<i>ḥawsh</i>	see <i>fana</i>	<i>ṣayfab</i>	summer house in the mountain regions
<i>ḥibāl kumbār</i>	rope made from <i>nārjīl</i> fibre	<i>shandal/chandal</i>	mangrove wood imported from East Africa or India
<i>ḥrwi</i>	see <i>fana</i>	<i>sikkah</i>	street
<i>ḥuṣn</i>	the Ruler’s fortress palace	<i>sintwānah</i>	column
<i>iwān</i>	see <i>līwān</i>	<i>sūr</i>	wall surrounding a building
<i>jāmi‘</i>	Friday mosque (as opposed to <i>masjid</i>)	<i>ṭābūq</i>	sea-sand lime building blocks, bricks
<i>jarīd</i>	scraped palm-frond stalks	<i>takbee</i>	back door of a house (Persian)
<i>juṣṣ</i>	gypsum plaster	<i>takhīl</i>	pointing
<i>karīn</i>	variation of <i>khaymah</i>	<i>ṭawf</i>	adobe bricks
<i>khaymah</i>	tent – word also used for a primitive palm-frond house	<i>ṭawī</i>	water well
<i>kbūṣ</i>	woven matting from palm fronds used for ceiling panels	<i>ṭīn</i>	clay
		<i>ṭūb libin</i>	mud brick
		<i>zillīj</i>	cut glazed tiles used in Islamic patterns for floors and murals

BIBLIOGRAPHY

Books

- al 'Abādī, N. H., *Dirasat fi Athar Turath Dawlat al-Imarat al-'Arabiyya al-Muttahda* (Studies in the Archaeological Relics and the Cultural Legacy of the UAE) (Abu Dhabi: 1990).
- *Masjid al Bidyah (Dirasat arkyulujjiyyah tarikhiya)* (Al 'Ayn: United Arab Emirates University, 1992).
- Ali, Dr J., *Al-Mufasssal fi Tarikh al 'Arab qabla al-Islam (A Detailed History of the Arabs before Islam)* (Beirut: 1976).
- Aga Khan Program for Islamic Architecture: Designing in Islamic Cultures Series.
- Adaptive Re-use
 - Continuity and Change
 - Design for High Intensity Development
 - Higher Education Facilities
 - Large Housing Projects
 - Urban Housing
- 'Conservation as cultural survival', Proceedings of Seminar 2 (Istanbul: Aga Khan Program for Islamic Architecture, 1978).
- Biddle, M. 'The experience of the past: archaeology and history in conservation and development', pp. 9–14.
 - Damais, S. 'The development of a conservation program', pp. 46–9.
 - Kuban, D. 'Conservation of the historical environment for cultural survival', pp. 1–8.
 - Makiya, M. 'A practicing architect looks at conservation', pp. 17–21.
- Al 'Ayn Municipality and Town Planning Department, *Nations in Bloom 1997* (Abu Dhabi: Government of Abu Dhabi, 1997).
- American Society of Heating, Refrigerating and Air-Conditioning Engineers, *1997 ASHRAE Handbook Fundamentals* (Atlanta: ASHRAE, 1997).
- Anderson, G., *Sharjah (UAE): The Urban Conservation Dilemma*, Arabic edition (Sharjah: Department of Culture and Information, 1995).
- Al 'Azzawi, Dr A.S., *Al Basra Khilal al-Tanqib wa al-Siyana li Sanat 1980–1985 (Basra during Excavation and Maintenance, 1980–1985)* (Sharjah: 1994).
- *Al Tarmim wa al Siyana (The Repair and Maintenance of Archaeological and Heritage Buildings)* (Dubai: Economic Press, 1991).
- *Mi'dhanat 'Anna: Tarkibuba wa Siyunatuba (Minaret of 'Anna City: Installation and Maintenance)* (Ajman: 1992).
- *Murshid al mbani al turathiyyah fi jazirat Dalma* (Dubai: 1996).
- *The Conservation of Heritage Buildings in Dalma Island, Emirate of Abu Dhabi, 1993–1994* (Sharjah: 1998).
- Al Bahnasi, Dr A., *Al-Fann al-Islami (Islamic Art)* (Damascus: 1986).
- Al-Basra Khilal al-Tanqib wa al-Siyana li Sanat 1980–1985 (Basra during excavation and preservation, 1980–1985)* (Sharjah: 1994).
- Bell, G. L., *The Palace and Mosque at Ukhaidir* (Oxford: 1924).
- Biancifiori, M. A., *Works of Architectural Restoration in Oman* (Rome: Edizioni di Luca, 1994).
- Biln, J. (ed.), G. B. Nalbantoglu and W. C. Thai, *Postcolonial Space(s)* (New York: Princeton Architectural Press, 1997).
- Bradshaw, V., *Building Control Systems* (Toronto: John Wiley & Sons Inc, 1985).
- Bukhash, F., 'The wind tower house of Dubai', World of Engineering.
- Bukhush, R., *Elements of Traditional Architecture in Dubai* (1996).
- The Buraimi Dispute*, Vol. 1 (London: Archive Editions).
- The Buraimi Dispute*, Vol. 22 (London: Archive Editions).
- Buraimi Memorials* (London: Archive Editions, 1987).
- Al Bustani, B., *Mubit al-Mubit (The Ocean, the Ocean, Dictionary)* (Beirut: 1974).
- de Cardi, B., *Qatar Archaeological Report: Excavations 1973* (Oxford: Oxford University Press for the Qatar National Museum, 1978).
- CIRIA, 'Hot weather concrete', CIRIA Special Publication 31.
- Cochrane, Timothy and Jane Brown (eds), *Landscape Design for the Middle East* (London: RIBA Publications, 1978).
- Codrai, Ronald, *Abu Dhabi: An Arabian Album* (Dubai and London: Motivate Publishing, 1992).
- Coles, A. and P. Jackson, *A Windtower House in Dubai* (London: Art and Archaeology Research Papers, 1975).
- Costa, Paolo M., *Musandam: Architecture and Material Culture of a Little Known Region of Oman* (London: Immel, 1991).
- Creswell, K. A. C., *Early Muslim Architecture*, 2 volumes (Oxford: 1932–40).
- *A Short Account of Early Moslem Architecture* (London: 1958).
- Damluji, S. S., *The Architecture of Oman* (Reading: Garnet Publishing, 1998).
- *Translucent City* (Reading: Garnet Publishing, 1997).
- Darby, M., *The Islamic Perspective: An Aspect of British Architecture and Design in the 19th Century* (London: World of Islam Festival Trust, 1983).
- Dostal, Walter, *The Traditional Architecture of Ras al-Khaimah (North)* (Wiesbaden: Reichert Verlag, 1984).
- Dubai Municipality General Projects and Maintenance Department, Historical Buildings Section, *Elements of Traditional Architecture in Dubai – Reference Book* (1996).
- Dubai Municipality Historic Buildings Department, *The Conservation of the Architectural Heritage in Dubai Emirate* (1996).
- Al-Fayruzabadi, M., *Al-Qamus al-Mubit (Arabic Dictionary)* (Beirut: 1987).
- Fleming, John, Hugh Honour and Nikolaus Pevsner, *The Penguin Dictionary of Architecture*, 4th edition (London: Penguin, 1991).
- Freeman-Grenville, G. S. P., 'Manāra, Manār', *Encyclopaedia of Islam* (EI2) (new edition), Leiden (1960–).
- Ghalib, Dr A. R., *Mawsu'at al-'Imara al-Islamiyya (Encyclopedia of Islamic Architecture)* (Beirut: 1988).
- Al Ghazali, *The Beautiful Ninety Nine Names of Allah* (Cambridge: Islamic Texts Society, 1995).
- Grabar, O., *The Alhambra* (London: Allen Lane, 1978).
- Hakim, Besim Selim, *Arabic-Islamic Cities: Building and Planning Principles* (London: Kegan Paul International, 1986).

- Hansman, John, *Julfār, an Arabian Port* (London: Royal Asiatic Society of Great Britain and Ireland, 1985).
- Hardy-Guilbert, C., *Mission archeologique à Julfar, Emirate Arabe Unis* (Paris: 1994).
- Hardy-Guilbert, Claire, V. Aitzegagh and V. Defert, *Qatar: fann al 'Imarat/Qatar: architectures* (Paris: 1985).
- Harter, G., Cleuziou, S., Laffont, J. P., Nockin, J. and R. Toussaint, *Emirat d'Abu Dhabi. Propositions pour Dalma, (Sept.-Oct., 1979)*.
- Heard-Bey, Frauke, *From Trucial States to United Arab Emirates: A Society in Transition* (London: Longman, 1996).
- Hillenbrand, R., *Islamic Architecture* (Edinburgh: Edinburgh University Press, 1994).
- Hourani, Albert and S. M. Stern (eds), *The Islamic City* (Oxford: Cassirer, 1970).
- Jacobs, J., *The Economy of Cities* (New York: Vintage, 1970).
- Al Jirwan, M. R., *Risala Ila Waladi (Letter to My Son)* (Sharjah: 1985).
- Ibn Kathir, *Al-Bidaya wa al-Nihaya (The Beginning and the End)* (Beirut: 1983).
- Kay, S. and D. Zandi, *Architectural Heritage of the Gulf*, Arabian Heritage Series (Dubai and London: Motivate Publishing, 1991).
- Kennet, D. (ill. Connolly, D.), *The Towers of Ras al-Khaimah*, BAR International Series 601 (Oxford: Tempus Reparatum, 1995).
- Ibn Khardazabah, Abu el-Kassem Abed Allah, *Al-Masalik wa al-Mamluk (The paths and the kingdoms)* (London: 1889).
- Al Khulayfi, M. J., *Al-'Imarat al-Talidiyah fi Qatar* (Doha: Qatar Ministry of Information and Culture, 1990).
- King, G. R. D., *The Historical Mosques of Saudi Arabia* (London: Longman, 1986).
- , *The Traditional Architecture of Saudi Arabia* (London: IB Tauris, 1998).
- , *Abu Dhabi Islands Archaeological Survey (ADIAS 1), An Archaeological Survey of Sir Banī Yās, Dalmā, and Marawah (21st March to 21st April, 1992)* (London: Trident Press Ltd, 1998).
- Ibn Kirdadhaba, Abu al-Qasim, 'Obayd Allah, *Al-Masalik wa al-Mamluk (Routes and Countries)* (Leiden: 1889).
- Koenigsberger, O. H., T. G. Ingersoll, A. Mayhew and S. V. Szokolay, *Manual of Tropical Housing Design, Part One: Climatic Design* (London: Longman, 1974).
- Konya, Allan, *Design Primer for Hot Climates* (London: The Architectural Press, 1980).
- Lefebvre, H., *Writings on Cities*, tr. E. Kofman and E. Lebas (Oxford: Blackwell, 1996).
- Lewcock Ronald and Zahra Freeth, *Traditional Architecture in Kuwait and the Northern Gulf* (London: AARP, 1978).
- Lorimer, John Gordon, *Gazetteer of the Persian Gulf, Oman and Central Arabia*, 2 volumes, vol. I, Historical, vol. II, Geographical and Statistical (Calcutta: 1908).
- Louis, *Al Munjid fi al Lugha (Dictionary of Languages)* (Beirut: 1986).
- Liotard, J.-F., *The Postmodern Condition: A Report on Knowledge* (Manchester: Manchester University Press, 1987).
- Ibn Manzur, A., *Lisan al 'Arab (Arabic Dictionary)* (Beirut: 1955).
- Mar'ashli, Nadim and Osama, *Al Sihab fi al Lugha wa al 'Ulum (The Authentic in Language and Sciences)* (Beirut: 1974).
- Mitchell, George (ed.), *The Architecture of the Islamic World: its history and social meaning, with a complete survey of its key monuments* (London: Thames and Hudson, 1978).
- Morris, A. E. J., *John Harris Architects* (Kent: Hurtwood Press, 1984).
- Morsey, A. M., *The United Arab Emirates, a modern history* (London: Croom Helm and New York: Barnes and Noble Books, 1978).
- El Mutwalli, R. T., *Qasr al Husn* (Abu Dhabi: Cultural Foundation, 1997).
- Olgyay, V., *Design with Climate: bioclimatic approach to architectural regionalism* (Princeton, NJ: Princeton University Press, 1976).
- Palmer, M. A., *The Architect's Guide to Facility Planning* (The American Institute of Architects, 1981).
- Pena, William, Steven Parshall and Kevin Kelly, *Problem Seeking: An Architectural Programming Primer* (AIA Press, 1977).
- Polo, M., (Middlesex: Penguin Books, 1958).
- Al Qashani, *Istila at al Iufyyah* (Cairo: 1981).
- Ibn Qaysar, A., *Sirat Nasir bin Murshid* (Muscat: 1983).
- Rashid, A. H., *Al-Husun wa al-Qila' fi Dawlat al-Imarat al-'Arabiyya al-Muttatabida (Fortresses and Citadel in the UAE)* (Dubai: 1992).
- Al Rashid, S. A., *Al Rabadha. A portrait of early Islamic civilisation in Saudi Arabia* (London: 1986).
- Al Razi, Mohammed Ibn Abu Bakr Ibn 'Abd al-Qadir, *Mukhtar al-Sabah* (Beirut: 1982).
- Rida, Shaykh A. R., *Mu'jam Matn al-Lugha (Arabic language dictionary)* (Beirut: 1958).
- Al Rostomani, A. H., *Dubai and its Architectural Heritage* (1991).
- Royal, Kent and Cliff Terry, *Hawaiian Design: Strategies for Energy Efficient Architecture* (University of Hawaii School of Architecture).
- Rutter, E., *The Holy Cities of Arabia* (London and New York: 1928).
- Said, E., *Culture and Imperialism* (London: Vintage, 1994).
- El Said, I. and Parman, A., *Geometric Concepts in Islamic Art* (London: World of Islam Festival Trust and Scorpion Publishing, 1976).
- Scholz, Fred, *Nomadismus. Theorie und Wandel einer sozio-oekologischen Kulturweise* (Stuttgart: 1995).
- Shankland Cox, *Master Plan for the Region of al 'Ayn*, 2 volumes (London: 1996).
- Shaykh al Jilani, Abdul Qadir, *The Secret of Secrets* (Cambridge: Islamic Texts Society, 1992).
- Shaykh Ibn al 'Arabi, Mu'iddin, *al Futu'at al Makiyyah*, ed. Osman Yahya (Cairo: 1972).
- Simon, Herbert A., *The Sciences of the Artificial* (Cambridge, MA: MIT Press, 1970).
- Slot, B. J., *The Arabs of the Gulf 1602–1784* (Leidschendam: published with the support of the Cultural Foundation in Abu Dhabi, 1993).
- SWECO, *Master Plan of the University Town of Al Ain* (The United Arab Emirates University, 1987).
- Al Tabari, A., *Tarikh al-Umam wa al-Muluk (History of Nations and Rulers)* (Leiden: 1910).
- Al-Tarmin wa al-Siyana li al-Mibani al-Athariyya wa al-Turathiyya (Repair and maintenance of historical buildings and the remains of natural heritage)* (Dubai: 1991).
- Thesiger, W., *Arabian Sands* (Middlesex: Penguin Books, 1977).
- United Arab Emirates University, *General Specifications for Construction Contracts*.
- United Arab Emirates University, *The National Atlas of the United Arab Emirates* (Al 'Ayn: 1993).
- United Nations Center for Human Settlements (HABITAT), *Corrosion Damage to Concrete Structures in Western Asia* (Nairobi: 1990).
- Whitehouse, D., *Siraf III. The Congregational Mosque and other mosques from the ninth to twelfth centuries* (London: 1980).

- Wilkinson, J. C., *The Imamate Tradition of Oman* (Cambridge: Cambridge University Press, 1987).
- Wilson, Arnold T., *The Persian Gulf* (London: 1928).
- Al Yaqubi, A., *Al Buldan (Lands)* (Najaf: 1957).
- Yaqut, S., *Mu'jam al Buldan (Dictionary of Nations)* (Beirut: 1955).
- Al-Zubaydi, M., *Taj al-'Arus min Jawabir al-Qamus (Arabic Language Dictionary)* (Cairo).

Articles

- al 'Abādī, N. H., 'Trmim suq al 'arasah bil Shariqah', *Uways Awards Book*, second cycle, 1991 (Dubai: Nadwat al thaqafah wal 'ulum, 1993).
- Architectural Review*, no. 964, June 1977 and no. 1213, March 1998.
- Architecture in Development: issue dedicated to 'Buildings for Higher Education and Research', *Mimar*, no. 37 (December 1990).
- Ardalan, N., 'Innovation and tradition', *Arts and the Islamic World*, No. 23: *Architecture, Archeology and the Arts in the United Arab Emirates*.
- Al 'Azzawi, Dr A. S., 'Al-Tanqib wa al-Siyana fi al-Kafal li Sanat 1977-1981' ('Excavation and Maintenance in al-Kafal during 1977-1981'), *Sumar Magazine*, no. 43 (1984).
- 'Tariq al-Hajj al-Qadim, Darb Zubayda, Mihattat Umm al-Quzun' ('Old Pilgrimage Route'), *Sumar Magazine*, no. 44.
- 'Al-Mash al-'Athari fi al-Gharbiyya 'Darb al-Sa'T' ('Archaeological Survey of the Western Desert'), *Sumar Magazine*, no. 46.
- Bokhari, A. V., 'Islamic versus Western European architecture: some notes on contemporary architecture in Islamic countries', *Arabian Journal for Science and Engineering*, vol. 7, no. 2 (April 1982).
- Carruthers, K. D. B., 'Architecture is space: the space positive tradition', *Journal of Architectural Education*, Cambridge, MA: The MIT Press, vol. 39, no. 3 (spring 1986).
- Codrai, Ronald, 'Palm Fronds, Coral-stone and Gypsum: The Architectural Heritage of the United Arab Emirates' in *Phoenix Rising* edited by M. Asher (London: HA International Associates Ltd, 1996).
- Cooper, P., 'Race for the sky', *Gulf Business*, vol. 2, no. 1 (May 1997).
- Correa, C. 'Transfers and transformations' in *Design for High Density Development 1985*, Aga Khan Program for Islamic Architecture.
- Cox, P. L., 'Some Excursions in Oman', *The Geographical Journal*, LXVI (July 1925).
- El Dali, T. and M. Abdel Latif, 'Al Ain desert community: preserving local environmental character' in *Arts and the Islamic World*, No. 23: *Architecture, Archeology and the Arts in the United Arab Emirates*.
- Diez, E., 'Eine schiitische Moschee-ruine aus der Insel Bahrein', *Jahrbuch des asiatischen Kunst*, 2 (1925).
- Eisenman, P., 'The futility of objects', *Harvard Architecture Review*, 3 (1986).
- Essaian, E. and Willems, D., 'Falayah Mosque' in C. Hardy-Guilbert, *French Archaeological Mission at Julfar, United Arab Emirates* (Qatar: Fann al-'Imara/ Qatar Architectures, 1994).
- Facey, W., 'The boat carvings at Jabal al Jussasiyah, northeast Qatar', *Proceedings of the Seminar for Arabian Studies (PSAS)*, no. 17 (London: Brepols, 1987).
- Fathy, Hassan, 'Architecture and environment', *Arid Lands Newsletter*, no. 36. Reprinted from *Natural Energy and Vernacular Architecture: Principles and Examples with Reference to Hot Arid Climates*, edited by Walter Shearer and Abd-el-Rahman Ahmed Sultan (Chicago: University of Chicago Press for The United Nations University, 1986).
- Flavin, K. and E. Shepherd, 'Fishing in the Gulf: Preliminary investigations at an Ubaid site, Dalmā, (UAE)', *Proceedings of the Seminar for Arabian Studies (PSAS)*, no. 24 (London: Brepols, 1994).
- Gabriel, P. and D. Garda, 'Climatic response of vernacular architecture: a case study from a maritime desert climate', *Arabian Journal for Science and Engineering*, vol. 14, no. 1 (January 1989).
- Hakim, Besim Selim, 'Islamic architecture and urbanism' in J. A. Wilkes and R. T. Packard, *Encyclopaedia of Architecture: Design, Engineering and Construction* (John Wiley and Sons, Inc., 1989).
- 'Arab-Islamic urban structure', *Arabian Journal for Science and Engineering*, vol. 7, no. 2 (April 1982).
- Hardy-Guilbert, Claire, 'Recherches sur la Periode Islamique au Qatar' in *Mission archeologique française á Qatar*, ed. J. Tixier (Paris and Doha).
- Hawkins, D. F., 'Primitive rock carvings in Qatar', *Proceedings of the Seminar for Arabian Studies (PSAS)*, no. 17 (London: Brepols, 1987).
- Kapel, H., 'Rock carvings at Jebel Jusasiyah, Qatar', *Arayan*, no. 8 (unseen).
- Kay, S., 'Domestic architecture', *Arts and the Islamic World*, No. 23: *Architecture, Archeology and the Arts in the United Arab Emirates*.
- King, G. R. D., 'Islamic Architecture in Eastern Arabia', *Proceedings of the Seminar for Arabian Studies (PSAS)*, no. 8 (London: Brepols, 1978).
- 'Excavations of the British team at Julfar, Ras-al-Khaimah, United Arab Emirates: Interim Report on the Second Season (1990)', *Proceedings of the Seminar for Arabian Studies (PSAS)*, no. 21 (London: Brepols, 1991).
- 'Excavations of the British team at Julfar, Ras-al-Khaimah, United Arab Emirates: Interim Report on the Third Season', *Proceedings of the Seminar for Arabian Studies (PSAS)*, no. 22 (London: Brepols, 1992).
- 'Bayt al Mu'ayyad. A late nineteenth-century house of al Bahrain', *Arabian Studies*, 4 (1978).
- Kultermann, U., 'Contemporary Arab architecture', *Mimar*, no. 3 (January-March 1982).
- Ishteaque, E. M., 'A designer's notes on the environmental approach to building design for hot-arid zones', *Arabian Journal for Science and Engineering*, vol. 13, no. 3 (September 1988).
- Ishteaque, E. M., 'Paradigms and styles: Saudi native architecture', *Arabian Journal for Science and Engineering*, vol. 15, no. 1 (January 1990).
- Longrigg, Stephen, 'The Liquid Gold of Arabia', *Journal of the Royal Central Asian Society* (now *Asian Affairs* published by the Royal Society for Asian Affairs), vol. 36 (1949).
- Manning, P., 'Environmental aesthetic design', *Building and Environment*, Elsevier Science, vol. 26 (1991).
- 'Environmental design as a routine', *Building and Environment*, Elsevier Science, vol. 30, no. 2 (1995).
- Manning P. and S. G. Mattar, 'A preliminary to development of expert systems for total design of entire buildings' in *Evaluating*

- and *Predicting Design Performance*, Yehuda E. Kalay (ed.) (John Wiley and Sons, 1992).
- Mattar, S. et al., 'A decision model for the design of building enclosures', *Building and Environment*, Elsevier Science, vol. 13 (1978).
- 'Application of the decision by exclusion rule: the design of external walls', *Building and Environment*, Elsevier Science, vol. 13 (1978).
- McCloskey, B., 'Lessons from neighbors: recycling Islamic environments', *Arabian Journal for Science and Engineering*, vol. 7, no. 2 (April 1982).
- 'Medinat al Salaam: Baghdad 1979–1983', *Process: Architecture*, no. 58 (Tokyo: 1985).
- Omer, M. A., guest ed., 'Traditional Architecture of Dubai', a special supplement of *Arts and the Islamic World*, nos. 27 and 28, London (c. 1997).
- Özkan, Suha, 'Complexity, coexistence and plurality' in *Architecture for Islamic Societies* (1984).
- Paulson, B. C., 'Designing to reduce construction costs', *Journal of the Construction Division*, vol. 102, no. CO4 (American Society of Civil Engineers, December 1976).
- al-Qadim, Tariq al-Hajj, 'Darb Zubeida Mahata Im al Kurun' ('The old pilgrim road'), *Sumar Magazine*, no. 44.
- Rentz, G., 'Al-Kawasim', in *Encyclopedie de l'Islam*, nouvelle edition, vol. IV (Paris-Leiden, Maisonneuve-Larose, 1976).
- Sahab, Freduni wa bu, Ferhan Abed el-Rahim, Muhammad Freduni and Nasser Hamed Khalifeh bu Shehab, 'Al-Barajil wa Faun al-Imara fi al-Khalij' ('El-Barjil and the art of architecture in the Gulf'), studies by writers of the Society of the Emirates, in *Majallat Dirasat Ittibad Kuttub wa Udaba al-Imarat*, no. 2 (1990).
- Schacht, J., 'Ein archaischer Minaret-typ in Ägypten und Anatolien', *Ars Islamica*, 5 (1938).
- Schneider, 'Minaret', *Encyclopaedia of Islam*.
- Sultan, Ghazi, 'Criteria for design in the Arabian Gulf Region', *Arabian Journal for Science and Engineering*, vol. 7, no. 2 (April 1982).
- Taillibert, R., in *Cabiers d'Art* (Rome: 1996).
- Uthman, F. A., 'Exporting architectural education to the Arab world', *Journal of Architectural Education*, vol. 31, no. 3, Cambridge, MA: The MIT Press (1978).
- De Waal, H. B., 'New recommendations for building in tropical climates', *Building and Environment*, Elsevier Science, vol. 28, no. 3 (1993).
- Whitehouse, D., 'Excavations at Siraf. Fifth Interim Report', *Iran*, X (1972).
- Willems, D. and Allaire, S., 'Bidiyah Mosque', in *French Archaeological Mission at Julfar, United Arab Emirates*, ed. C. Hardy-Guilbert (Paris: 1994).
- Yousuf, N., 'The Pattern', *Arts and the Islamic World*, No. 23: *Architecture, Archeology and the Arts in the United Arab Emirates*.
- Zandi, D., 'Development of architecture in the Gulf', *Arts and the Islamic World*, No. 23: *Architecture, Archeology and the Arts in the United Arab Emirates*.
- Zandi D. and S. Kay, 'Restoration of Shaikh Saeed House in Dubai', *Arts and the Islamic World*, vol. 4, no. 4 (autumn–winter 1987/8).

Reports and papers

- Allen, W. and S. G. Mattar. 'Fundamentals of project management', Course Notes, University of Calgary, 1985.
- Coles, A. and P. Jackson, 'A wind tower house in Dubai', Art and Archeology Research Papers, London, 1975.
- Damluji, S. S., 'The Other Environment' (paper presented at Asilah, Morocco: np, 1994).
- Al-Mutawalli, R., 'On Citadels and Fortresses in Abu Dhabi' (a lecture at a seminar on museums and their role in the UAE, al 'Ayn University, 6–7 December 1992).
- 'Post Occupancy Evaluation', a research paper presented to the UAE Housing & Urban Planning Conference, UAE University, February 1986.
- UAE Ministry of Planning, *Annual Statistical Abstract*, 17th edn (1992).

ACKNOWLEDGMENTS

Salma Samar Damluji

The research for this book required several cross country journeys over the period 1996–1998 in search of the architecture, material, contributors and architects, and this work would not have been possible without the cooperation, encouragement and hospitality of officials in the United Arab Emirates. I am therefore grateful to HH Shaykh ‘Abdullah bin Zayid Āl Nahyān, Minister of Information and Culture for hosting me in the Emirates and assisting me with the coordination of my visits to sites and remote locations of the Northern Emirates; HH Shaykh Nahyan bin Mubarak Āl Nahyan, Minister of Education for our meetings and discussions over this work; Abu Dhabi Air Force for flying me out for aerial photography on two occasions; Ibrahim Al Abed, Adviser, Ministry of Information & Culture and Director, External Information Department, for organizing and facilitating my visits.

I am indebted to HM Ambassador Anthony Harris and Sophie Harris, Shaykhah Shamsah bint Hamdan, David and Hafida Latta of the British Council, Robert and Laura Sykes of the British Council, ‘Abadi Arkan Abadi of Arkan Consultants and Architects, Abbad al Radi and Nazar Ahmad of Planar for the hospitality and assistance they gave me while I was in Abu Dhabi. Nassouh al Amin, GM All Prints and Publishing, was of essential support in establishing the momentum and follow-up of the research. His contribution in facilitating my work and his assistance with each visit provided an invaluable resource of attention and kindness.

In al Sharjah, HH Shaykh Dr Sultan bin Mohammed Al Qasimi, Ruler of al Sharjah for his interest in the work and the unfailing assistance I was granted, particularly by Dr A. S. al ‘Azzawi and ‘Abdul ‘Aziz bin Shuhail, Director of Heritage at the Department of Culture and Information. Naṣir al ‘Abudi for making available his research for my documentation; and Christian Velde and Imke Moellering, Resident Archaeologists at the National Museum of Ra’s al Khaymah.

In Dubai, Rashad Bukhash, Head of the Historical Buildings Section and Adel M Abdalla, Head of the Studies and Research Unit, Historical Buildings Section, Dubai Municipality.

In al ‘Ayn, Ahmad Mohammed Shareef, Director, Town Planning Department, al ‘Ayn and Ṭalāl ‘Abdullah for their contribution and assistance in reviewing the project on my several visits to al ‘Ayn, and Dr M. Hasan Al Naboodah for his research on the forts and traditional fabric of al ‘Ayn.

My thanks are also due to Dr Suha Özkan, Jack Kennedy and Bill O’Reilly at the Aga Khan Trust for Culture, Geneva for providing unlimited access and help with researching the Award archives, which allowed me to review the documentation of architectural projects nominated for the Award that would have otherwise proved difficult to source.

I am grateful and indebted to the encouragement and support of HH Shaykh Sultan Bin Zayed, Deputy Prime Minister who valued the contribution of such research to the understanding and development of architectural thought and future design in the cities of the UAE. His vision and profound sense of appreciation for the cultural traditions and environment will undoubtedly provide a different approach to the importance and meaning of creative modern architecture.

The manuscript for this book was completed in 1999 and updated in the fall of 2000 with the addition of new projects in the UAE.

The Islamic Architecture of Dalma Island – Geoffrey King

HH President Shaykh Zayed b. Sultan Al Nahyan kindly gave permission for the fieldwork to be carried out in 1992 and received us on Ṣir Bani Yās at the

end of Ramaḍān. HE Shaykh Nahyan b. Mubarak Al Nahyan generously supported the project and encouraged the idea of the Abu Dhabi Islands Archaeological Survey (ADIAS) from its inception. Mr Peter Hellyer, Coordinator of the ADIAS project and the then Chairman of Emirates Natural History Group was instrumental in the organization of our fieldwork and did an immense amount to bring it to a successful conclusion.

Much local support was given at Dalmā, which is greatly appreciated, and we particularly would like to thank Mr Ghassan al Ghossain for his efficient organization of the team’s travel and accommodation on the islands. We acknowledge the assistance given to us in Dalmā by Mr Eid al Mazru’i of the Dalmā *baladiyyah* who actively and frequently participated in our work. Mr Sa’id al Ghurayba and members of his family gave us a great deal of information about Dalmā: we thank him and his family both for this and for their hospitality.

The UAE Air Force transported the team and we express our thanks to the aircrew involved. Generous support was also given to the project by Dr Peter Clark, formerly Director of the British Council, Emirates Airlines, the al Fahim Group, Abu Dhabi Company for Onshore Oil Operations (ADCO), the Union National Bank, Abu Dhabi, Abu Dhabi National Hotel Company, Wimpey (Abu Dhabi), Spinneys, and the Higher Colleges of Technology, Abu Dhabi. Without this support, the team would have been unable to carry out the project and we express our thanks to all our sponsors.

Mr David Connolly, an ADIAS team member, drew the plans and elevations.

Illustration credits

The Publishers would like to thank the individuals and organizations whose assistance and cooperation made this book possible. Every effort has been made to trace the copyright holders and we apologize in advance for any unintentional omissions. We will be happy to insert the appropriate acknowledgment in any subsequent edition.

All illustrations are courtesy of Salma Samar Damluji except:

Aga Khan Award for Architecture: for drawings in ‘Brave New Cities’

AKAA, Geneva: 54–5, 58, 125–7

American University of Sharjah, 2000: 94, 95, 96 (top), 98, 99

Arkan Architects and Consultants: 48–52, 103

WS Atkins and Partners Overseas: 79, 81, 86

B.P.: all illustrations in ‘Adapting to Change’

Garnet Publishing Limited, Translucent City, 1998: 43–7

Geoffrey King: all illustrations in ‘The Islamic Architecture of Dalma Island’

GEOprojects (UK) Ltd: vi–vii, 104

Hassan Muhammad Al Naboodah: all illustrations in ‘The Forts and Towers of Al ‘Ayn’

NORR Group Consultants International Limited: 60–3, 67, 70 (top), 72, 74 (top), 77 (top and right)

NORR Group Consultants International Limited (Bob Harr of Hedrich Blessing): 65, 66, 69, 71, 73, 75

Keith Olroyd-Robinson: illustrations in ‘The Urban Architecture of Al Bastakiyyah’

Didier Willems: all illustrations in ‘The Ancient Mosques of Ra’s al Khaymah’

Zaha Hadid Studio, London: 29, 30, 119

INDEX

Photographs are indicated by page references in *italic*. Extended discussion of a building, including photographs, is indicated by page references in **bold**.

- A**
- ablution facilities, in mosques 176, 218
- Abu Dhabi 7, 16, 29, 30, 31–3, 33, 36, 103, 269
- buildings
- Abu Dhabi Company for Onshore Oil Operations Headquarters 60
 - Abu Dhabi Marine Operating Company Headquarters 116
 - Armed Forces Officers' Club and Conference Centre 43–7
 - Al Baṭīn Airport 106
 - Baynunah Tower 48–52, 136, 137
 - British Embassy 108
 - Central Hospital 105
 - Central Market 113
 - Central Meat, Fish, Fruit and Vegetables Market 128–9
 - Central Post Office 115
 - Chamber of Commerce and Industry Tower 111
 - Cultural Foundation 105, 107, 124–7, 142
 - Etisalat Headquarters Building 132–3
 - Forte Grand Hotel 60, 131–2
 - Hotel Intercontinental 131
 - Al Ḥuṣn Palace 13–14, 27, 107, 108, 124
 - Jazira 105
 - Khaledya Cooperative Society Building 25, 129–30
 - Library and Cultural Centre 25, 28, 124
 - Al Maqṭa' Bridge 106
 - Al Maqṭa' fort 252–3
 - Marina Mall 106
 - Meridien Hotel 34
 - Ministry of Finance and Industry 25, 53
 - Al Muhairy Centre 60
 - Municipality and Planning Complex 105, 107
 - Al Muṣaffaḥ Bridge 106
 - National Museum of al 'Ayn 30
 - Al Omairah Residence 34
 - Rabdan Complex 115, 137
 - Raisa Bint Darwish Building 135–6
 - Shaykh Khalifah Hospital 105
 - Shaykh Khalifah Public Park 106
 - Shaykh Saif Bin Muhammad Bin Butti Building 134–5
 - Union National Bank Head Office Building 60, 133–4
 - al Wahda Sports Centre 30
- general
- British School 13
 - central business district 109
 - city plan 103–6
 - Development Plan 119
 - expansion beyond island 118–19
 - first-generation buildings 117
 - gardens 105, 106
 - grid-iron plan 101, 103, 107, 111, 118
 - New Third Bridge Crossing project 30
 - open spaces 110–11
 - parking provision 122
 - plot sizes 110, 117, 121, 141–2
 - road layout 118
 - road transport 106, 110, 111, 122
 - al Shahāmah 119
 - town planning 31–3, 35–6
 - urban development 11–12, 101–2
- Abu Dhabi Islands Archaeological Survey 151
- al 'Abūdī, Nāṣir 304, 305, 314n
- adobe 84, 145
- Aga Khan Award for Islamic Architecture 54, 58, 59
- agriculture 143
- Aḥmad bin Dalmūk, Shaykh 294
- air-conditioning 195
- air shafts 245
- alcoves 250, 251–2
- Al 'Alī, Ṣalīḥ Aḥmad 240
- aluminium 54, 113, 115, 133, 134
- Anderson, Graham 313n
- Arab cities 25–6, 28
- Arab/Islamic tradition 23–5, 99
- on Dalmā island 151–76
 - in modern architecture 24, 26–7, 33, 36, 44, 99, 113, 116, 122, 124, 128–9, 134, 142
- arcades 94, 124, 140, 142, 185, 294
- arches 23, 112, 113, 116, 219, 306
- blind 58, 154, 155, 156, 160, 164, 166, 167, 171, 193, 278, 289, 300
 - broken 156
 - Gothic 96, 212
 - horseshoe 88
 - lobed 251
 - semi-circular 58, 170, 193, 251
 - use of in modern architecture 122, 142
- The Architects Collaborative (TAC) 25, 28, 124
- architectural heritage 142–3
- Dubai 288–97
 - reconstruction of 265–85
- architectural profession, in Abu Dhabi 123
- architectural style 142–3
- Ardalan, Nader 116
- 'arīsh 8, 35, 39, 40, 41, 140
- see also* palm fronds
- Arkan Architects 48, 136
- Ash-Shimal mosque 209, 210, 211, 216, 220
- Atkins, WS and Partners 79, 86
- Al 'Ayn 33
- forts 35, 223–5, 226–37
 - housing development 139–44
 - original housing 35–6
- Al 'Ayn oasis 8, 10, 35, 143, 145–6
- Al 'Ayn University 36, 37–8
- al Azzawi, A.S. 151, 268, 269
- B**
- bād gīr* (windcatchers) 154, 155, 156, 160, 173, 176, 184, 218, 244, 303
- Baghdad 26
- Bahrain, mosques in 173, 175
- al-Balādhiri 240
- balconies 183, 192, 194
- Banī Yās 39, 180, 224, 225
- barasti houses 8, 15, 181, 183, 191
- re-development of 182
 - see also* 'arīsh

Baris 26
 al Bastakiyyah (Dubai) 179, 183–95
 conservation of 197–203
 development of 181–3, 195–6
 battlements, of *murabba'at* 252–3, 263
 Baynunah Tower (Abu Dhabi) **48–52**,
 136, 137
 Bayt al Bahr (Dubai) 82, 83, **84–5**
 Bayt al Muraykhi (Dalmā Island) **152–6**
 beam and column principle 189
 Bedouin 8, 9, 11
 settlements in Līwā 39, 40–1
 urbanization of 40–1, 140, 143
 Bida' Zāyid 36
 al Bidiya mosque 173, 175, **304–5**
 Biln, J. 309n
 boat drawings 170, 171–2
 breeze-blocks 15, 210, 218
 bricks 213, 249, 255
 mud 23, 35, 213, 247, 249, 255, 299,
 301
 sand 213
 Brown, K. and Cantacuzino, S. 27
 Buckminster Fuller and Frei Otto 44
 building plots, size of 110, 117, 121,
 141–2
 al Bukhā' mosque 173, 175
 Burj al-Arab (Dubai) 79, **86–92**

C

'Cairene' style 93–4
 Cairo, Sultan Hasan mosque 24
 canopies 252, 306, 307
 capitals 116, 160, 192, 194
 cars 17
 see also parking provision
 cement 15, 159, 164, 167, 190
 Chadirji, Rifaat 27
 cities 25–6
 Civic Design Studio 54
 clay 223, 255
 Cleuziou, S. 151, 313n
 climate 5
 effect on design 184–5
 coastal area, housing 11–12, 301, 307
 cobbles, limestone 301
 Coles, A. and Jackson, P. 179–80, 184,
 188, 189, 190
 columns 24, 88, 89, 116, 160, 164, 170,
 189
 polygonal 219
 repair and conservation 284
 on verandas 193
 commercial buildings 15, 102, 121–2,
 133–4, 152, 156
 Abu Dhabi 31, 111–16, 129–36, 137
 Dubai 60, 62, 64
 and residential 102, 105, 109

Committee for the Preservation of the
 Arab Islamic Architectural Style
 36
 concrete 15, 44, 54, 124, 129, 190, 210,
 215
 GRC 15, 113, 115, 135, 136, 182,
 196
 pre-cast 113, 115, 135
 conservation 270, 283–4
 al Bastakiyyah 197–203
 Dubai 288–97
 Ḥattā' village 298–9
 construction industry 117–18
 consultant practices 36
 coral 8, 183, 185, 189, 190, 196, 210,
 255, 268, 270, 301
 on houses 12, 23
 on windtowers 181, 183
 courtyard houses 183–4, 194–6, 306,
 307
 architectural features 191–4
 construction methods 189–91
 family area 188–9
 plot ratio 195
 public area 187
 courtyards 26, 142, 188, 278
 in modern architecture 54, 58, 59,
 97
 mosques 159, 164, 167, 174
 Cox, P.L. 224
 crenellations 252–3, 263
 cultural representation 24, 99

D

dakkab 140, 254
 Dalmā Island 151
 merchant's house **152–6**
 mosques **157–76**
 al Muraykhi House 256
 date palms 7–8, 9
 see also palm branches; palm fronds;
 palm trees
 Ḍāyah mosques 206, 213, 215, 216,
 220, 221
 Dayrah 12, 180, 181
 decoration 175, 176, 278, 284, 292
 of ancient mosques 219–20
 dogstooth 156
 of *murabba'at* 242
 plaster panels 160, 164, 165, 166–7,
 170, 171, 175, 176, 192, 194
 see also geometric patterns
 Department of Social Services and
 Commercial Buildings (DSSCB)
 31, 32, 33, 102
 Design Review Section 32
 Leasing Section 32
 Technical Section 32

desert areas, urbanization of 145
 Dewan 137
 Dexter, D. 89
 Dhaid 8
 Dibā oasis 8, 10
 domes 128, 215, 253, 305
 doors
 courtyard houses 192
 mosques 159–60, 164, 170
 murabba'at 242–3
 Dostal, W. 173, 207, 221, 299
 drainage 164, 190, 214, 216, 217
 Dubai 8, 16, 59, 59
 buildings
 Bayt al Bahr 82, 83, **84–5**
 Bayt al Shaykh Sa'īd bin Maktūm
 27, 58, **289–92**
 Bayt al Turāth 296
 Bayt al Wakil 293
 British Bank of the Middle East
 59
 Burj al-Arab 79, **86–92**
 City Hall Complex **54–7**
 Dalmūk mosque 297
 Diwān of the Emir 27, 59
 Dubai Hospital 59
 Emirates Towers 62, **64–78**
 Hilton Hotel 59
 Itiḥād School 59
 Jumeirah Beach Hotel 79, **80–5**
 Jumeirah Beach Resort **79–92**
 Khawr Dubai 288
 Madrasat al Aḥmadiyyah **294–5**
 al Maktūm Hospital 59
 Metropolitan Hotel 59
 National Bank of Dubai
 Headquarters Building 59,
 60–3
 al Rās 288, **294–7**
 al Sūq al Kabīr 288
 Trade Centre Tower 59
 Wild Wadi 79
 see also al Bastakiyyah
 general
 Abra Point 59
 conservation 288–97
 development of 12
 harbour 10, 11
 history of 180–1
 al Shandaghah 180, 181, 288
 Dubai Municipality 203, 289, 290
 Historic Buildings Department 180,
 288, 295, 298

E
 economies, traditional 9–10
 El Said, Issam 24
 electricity 15